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THE IRON TRADE REVIEW

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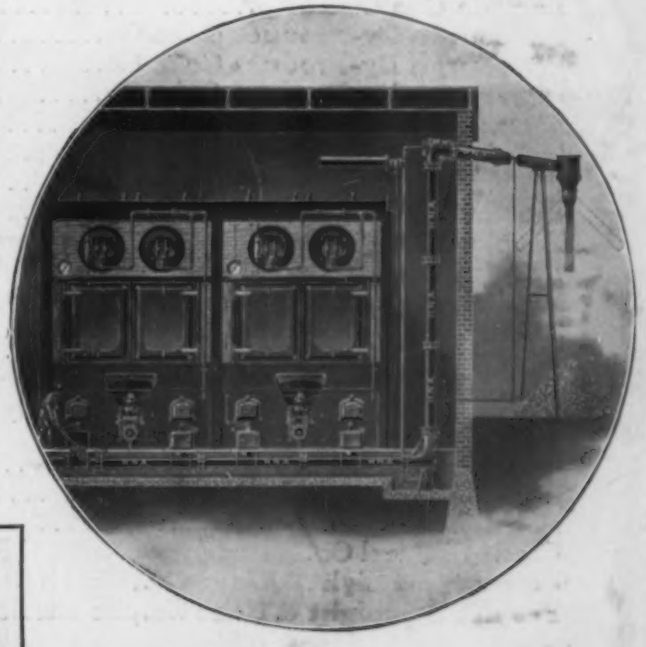

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FURNACE AND COMBUSTION ENGINEERS
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THERE ARE TWO KINDS OF STEAM JET ASH CONVEYORS
HAGAN *and* OTHERS

Advertisers' Index, pages 128-129. Contents, page 57. "Where-to-Buy," page 66.
Engineering Directory, pages 102-103. Classified Advertisements, pages 109-127.

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Peoples Gas Light & Coke Co., North Station	Chicago, Ill., Repeat Order
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THE IRON TRADE REVIEW

Vol. LXI Cleveland, September 27, 1917 *No. 13*

Steel Trade Approves New Prices

Manufacturers Will Support New Schedules—Federal Supervision Causes Some Bewilderment But Situation Will be Cleared Up Soon—Old Contracts Will be Enforced—War Needs Grow

SWEEPING price-fixing under federal supervision has plunged the iron and steel industry into a maze of unparalleled conditions. Complete suspension of the tightly drawn relations of free supply and demand has produced the inevitable results of initial bewilderment and some apprehension. The same spirit of liberal accommodation to the general good which dictated the agreement with the government, however, is impelling the industry to adjust itself swiftly to the self-imposed restrictions. The reductions in some lines, mostly plates, are considered out of harmony with the true economic conditions. Nonproducers of raw steel among the mills, excepting platemakers, are left in doubt as to how to operate profitably. Some furnaces and mills which have come in on the wave of high prices may be obliged to suspend operations or forsake profit. Generally, however, the government's actions have won the industry's approval and complete support. Much importance is attached to the announcement that present contracts in iron and steel will not be affected by the new prices.

Pig Iron at New Level

General knowledge as to the exact way the base price of $33, valley, on No. 2 foundry and basic will apply to other grades and districts still is lacking in pig iron. The market, however, already has made quick shift to align itself with the new level. A 5000-ton sale of bessemer has been made to a Mahoning valley steelmaker at $36.30, valley. This price amounts to 10 per cent over the base figure, which about represents the differential in the prices of this grade over foundry and basic over many years. An exchange deal of 1000 tons of basic for an equal amount of bessemer at the $36.30 and $33 prices also has been put through. In this bessemer transaction, the price has been made subject to final governmental adjustment. The expectation is entertained that existing freight differentials from valley territory will be a determining factor in fixing prices in other districts. This schedule now is being worked out in Washington, with the advice of leading manufacturers. Bearing upon the question of the equitable character of the new prices in iron at this time, is the fact that the shipping invoices in most any of the districts today are well under $33. In Ohio lake and surrounding territory, shipments last month averaged $27. Some $22 iron still is going out in the north. Some furnaces will not average over $28.50 this year. Others will exceed the fixed market. Present invoices at Chicago run from about $28 to $45. Under the new price, the furnace which sold the navy 6000 tons of foundry iron at an initial payment of $27.50 now will receive the difference. A 10,000-ton sale of foundry iron at $35 to the Emergency Fleet Corp., however, is a fixed one.

Buying at New Prices

The agreed schedule now is being applied in a large tonnage of orders previously closed by the government on a provisional price basis. New orders have been distributed in the week at the fixed prices, including about 2500 tons of plates, shapes and bars for cranes to be used in France. Purchases of fabricated steel for standardized ships are about to be made broadcast following the adoption of the design for the 5000-ton craft. Approval of the 10,000-ton design is near at hand.

Buyers Are Taking Stock

Hesitancy among private buyers has been the natural accompaniment of the sweeping government announcement. The trade is taking stock of the situation and with the restraints of uncertainty now dispelled more vigorous buying of accumulated needs is expected. How the average consumer will fare under the proposed system of distribution which classifies manufacture according to the relation of the business to war needs or public good, is an open question. The difficulty of the commercial buyer in getting orders from producers more and more deluged with military requirements are not going to be reduced with the government rather than the producer doing the distribution.

The Iron Trade Review
EDITORIAL

Federal Control---A New Page in Iron and Steel

GOVERNMENTAL price-fixing in iron and steel has been transformed from an uncertain and prolonged prospect into a reality. It has come about in a more sweeping fashion than the industry had been led to expect. It has precipitated a condition without parallel in the history of the industry and one fraught with endless possibilities of immediate trade significance and of future influence. The first effect has been to confuse and bewilder and to raise questions of doubt which have produced some apprehension. On the whole, however, the reception of the government's announcement has been sober, conservative and singularly free from intemperate predictions of disaster and of complaint on the part of those most affected financially. In this respect the industry has acquitted itself in a manner reflecting upon the high motives of patriotism of its personnel and befitting its stability as a leading branch of the nation's business.

Many important questions of trade importance, as was to have been expected, have pushed their way to the front following the official announcement. One of the most far-reaching of these is the effect of the reduced price on the huge tonnage of unshipped orders and contracts on mill and furnace books, many of which were entered at figures far above and not an inconsiderable portion below the new schedule. Positive announcement is made at Washington that the fixed prices will not be retroactive. Such was the precedent established in the fixing of coal prices. This being so, will buyers cancel or refuse to specify against these higher-priced contracts in the expectation that they will be able to fill their requirements on the new basis? A farther very vital question concerns the manner in which the priority of distribution of new orders shall be arranged, especially of that tonnage which will be open to the nonwar trade. In all probability this very important function will be performed by the priorities committee under the advice of experienced men of the industry. For the average buyer, nothing will be so important as the methods that will be pursued to assure the most equitable decision of the open market material or that over and above the direct and indirect war needs of the government and its allies. Apparently for many consumers a previously arranged position on mill books even at a high price with an assurance of even distant delivery will be more attractive than the uncertain probability of getting material at the reduced figure under federal auspices. For that reason cancellations of contract tonnages and undelivered specifications are not likely to be many, at least until the workings of the new system are better understood.

The new prices are aimed to sustain large production. They are not likely, however, to keep output on its recent maximum keel. Some of the smaller and higher cost plants in all probability will be forced to shut down. This seems to be a general expectation in the industry and apparently that eventuality has been discounted by the federal authorities. Any loss of this kind may be compensated for by new extensions of the larger plants coming into service and in rolled products, by a harder driving of the mills in certain lines where the demand is heaviest especially if the necessities are of a war character. However, any diverting of tonnage of this kind obviously will not contribute toward relieving the position of the private buyer, since the military requirements will be the chief impulse behind concentration of production in any given material. The critical problem for many of the blast furnaces will be whether they will be able to get coke supplies at the fixed price. In the light of the difficulties that have existed recently at much higher prices there is much skepticism on this point. The coke producers are carrying a heavy responsibility in the maintenance of general iron and steel production and their genuine patriotism will be judged accordingly.

By the end of the present year, the steel industry, it is estimated, will be capable of turning out approximately 48,000,000 to 49,000,000 tons of ingots and perhaps 36,000,000 tons of finished product, that is, if the pig iron is available. This is 5,000,000 to 6,000,000 tons of ingots and 3,000,000 to 4,000,000 tons of finished steel more than last year. From this must come, it is estimated, 6,000,000 tons of war steel which the government did not require last year. Experience has shown that these estimates of government war essentials err on the side of understanding rather than of exaggeration. Then there are heavy miscellaneous war demands of an indirect nature which do not admit of estimate, but must come in for equal attention, not to speak of the needs of the allies still to be taken care of. The prospect is that not only the increased capacity, but the saving of tonnage by the export embargoes against neutral countries now in force, will be more than absorbed by the government's requirements. This is on the most favorable hypothesis

The Iron Trade Review
EDITORIAL

that full production can be realized. Any way the situation is viewed, the difficulties of the average commercial buyers to get steel are not likely to be reduced under government price control such as now has been inaugurated.

It has been repeatedly stated the government has possessed no legal warrant to bring about such a wholesale price adjustment as that which now has been effected by assent of the producers themselves. Consequently, the impulse behind the program to which the manufacturers have pledged themselves is to be found in their conception of highest duty. No truer demonstration of lofty patriotism could have been given. At the same time, the industry has made its own honor, transcending written law, as the force binding it to the faithful performance of the great service to the nation to which it is committed.

Practical Patriotism Mobilized

OVERWHELMING sentiment in favor of simultaneously fixing the price of labor with that of a government price-fixed product in which it enters, was expressed by the great army of business men that constituted the war convention of the chamber of commerce of the United States at Atlantic City last week. Either the members of the resolutions committee did not hear the ovations accorded such recommendations, or it concluded that this step was too radical and perhaps was not in accord with the stereotyped national legislation which makes an exception of agriculture and labor in all laws that are enacted, not intended as class legislation, of course, but merely to compel every other industry and interest to do something which might jeopardize these two.

However, mobilized business can satisfy itself with the recommendation that an arbitration board be formed which will prevent strikes and lockouts for the period of the war. In addition, both employers and employes are warned to maintain a sort of condition of *statu quo ante*, that is, that during the present emergency they should not attempt to change the standards which they were unable to change under normal conditions. The enactment of laws to define as treason such violent acts as members of the I. W. W. have been guilty of, was asked, but no reference was made to these demands by the committee on resolutions.

The convention was successful beyond the fondest expectation of its promoters. It afforded American industry an opportunity to give expression to its patriotism, to demonstrate its loyal support of the government and to suggest to the authorities at Washington, who are swamped with recommendations, in well-digested resolutions, ways and means whereby the transaction of government business may be expedited and how to still further the national defense.

The convention went on record unequivocally in favor of fixing prices by a war board that shall have power to do all war buying. These prices, established by this board, shall apply, not only to the government, but also to the public on all essential products. Furthermore, it shall have the power to distribute the output in a manner to promote the national defense. Demand was made that such prices be made to apply on existing contracts, but assurance that this will not be done is reflected by the President's action in fixing the price of coal. Of course, prices will be fixed by agreement, although there is a strong feeling in Washington that no further legislation is necessary, other than already exists, to give the President the power to establish prices on all commodities deemed essential to the conduct of the war.

Any doubt that may have existed regarding the successful mobilization of our industries was dispelled at Atlantic City last week.

Boosting Their Own Game

WHATEVER may be the outcome of the disagreement between government officials and coal operators concerning the $2 base price, one unusual circumstance stands out prominently. The union mine workers' voices have been raised in harmony with those of the operators demanding more money for the latter.

However, on closer examination there is nothing philanthropic in the union miner's new friendliness toward their employers. They frankly want an increase in wages. The operators have just as frankly told them that they have no chance to get it on the basis of $2 bituminous coal. Hence the united front shown by the joint appearance at Washington of leading officials of the United Mine Workers of America and the operators in demanding a higher rate.

The miners threaten to strike unless their employers are given more money. They threaten to do this in spite of Samuel Gompers' assurances to the government that organized labor would do nothing to hamper the government in its conduct of the war. One of the very vital necessities of the war is fuel—bituminous coal especially. Friends and critics alike of organized labor will watch developments with keen interest.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 690

PIG IRON

(Delivery this year.)

Bessemer valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
*Basic, eastern Pa.	50.00 to 52.00
*Basic, Buffalo	54.00 to 55.00
Malleable, Pittsburgh	37.25
Malleable foundry, Chicago	33.00
*Malleable foundry, Phila.	55.00 to 56.00
*Malleable foundry, Buffalo	53.00 to 55.00
*No. 1X, Phila.	53.00 to 55.00
No. 2 foundry, Pittsburgh	33.95
*No. 2 foundry, Cleveland	54.00 to 55.00
*No. 2 foundry, Ironton	54.00 to 55.00
*No. 1 foundry, Chicago	56.00
No. 2 foundry, Chicago	33.00
*No. 2X foundry, Phila.	50.50 to 53.50
*No. 2X foundry, N. J. tide	50.75 to 53.75
*No. 2X foundry, Buffalo	53.00 to 55.00
*No. 2 plain, Philadelphia	49.50 to 51.50
*No. 2 plain, N. J. tide	49.75 to 51.75
*No. 2 plain, Buffalo	52.00 to 54.00
*No. 2 southern, Birmingham	47.00 to 49.00
*No. 2 southern, Cincinnati	49.90 to 51.90
*No. 2 southern, Chicago	50.00 to 54.00
*No. 2 southern, Phila. del.	51.50 to 52.50
*No. 2 southern, Cleveland	51.00 to 52.00
*No. 2 southern, N. Y.	51.25 to 52.25
*No. 2 southern, Boston	52.00 to 53.00
*No. 2 south. interior, N. E.	53.00 to 54.00
*No. 2 southern, St. Louis	48.50 to 52.50
*Virginia, No. 2X, furnace	51.00
*Virginia, No. 2X, Phila.	53.75
*Virginia, No. 2X, Jersey City	54.00
*Virginia, No. 2X, Boston	54.25
*Gray forge, eastern Pa.	44.00 to 46.00
*Gray forge, Pittsburgh	30.95
*Gray forge, Birmingham	45.50 to 46.00
*Silveries, 8 per cent, furnace	80.00 to 85.00
*Silveries, 8 per cent, Chgo.	85.00 to 92.50
*Low phos. standard, Phila.	90.00 to 92.00
*Low phos. Lebanon furnace	80.00
*Low phos., Pittsburgh	82.00 to 85.00
*Charcoal, Superior, Chicago	59.50 to 62.00
*Charcoal, Superior, Buffalo	55.00 to 60.00
*Charcoal, Birmingham	55.00 to 60.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
*Connellsville furnace, contr.	8.50
*Connellsville foundry, contr.	12.50
*Connellsville foundry	13.00 to 14.00
Wise county furnace, contract	10.00 to 11.00
Wise county foundry, contract	11.50 to 12.00
Pocahontas furnace, contract.	10.50 to 11.00
New River foundry, contract	13.50 to 14.00
New River furnace, contract.	8.50 to 10.00

FERRO ALLOYS

Ferromanganese, prompt	$375.00
Ferromanganese, last quar.	375.00
Spiegeleisen, 20 per cent furnace, remainder of year.	80.00
Ferrosilicon, 50 per cent, Pitts.	200.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	140.00 to 150.00
Bessemer ferrosilicon, 9 per cent.	$94.00
Bessemer ferrosilicon, 10 per cent.	95.00
Bessemer ferrosilicon, 11 per cent.	97.50
Bessemer ferrosilicon, 12 per cent.	100.00
Bessemer ferrosilicon, 13 per cent.	105.00

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O., furnaces.

SEMI-FINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$70.00
Open hearth, Philadelphia.	90.00 to 100.00
Open hearth, Youngstown.	90.00
Bessemer, Pittsburgh	70.00
Bessemer, Youngstown	80.00 to 85.00
Forging, Pittsburgh	125.00
Forging, Philadelphia	115.00 to 125.00
Forging, Chicago	125.00

SHEET BARS

Open hearth, Pittsburgh	$80.00
Open hearth, Youngstown.	90.00
Open hearth, Cleveland	90.00 to 95.00
Bessemer, Pittsburgh	80.00
Bessemer, Youngstown	90.00

WIRE RODS, MUCK BAR, SKELP

Wire rods, Pittsburgh	$90.00
Muck bar, Pittsburgh	85.00 to 90.00
Grooved skelp, Pitts., nom.	4.00c to 4.50c
Sheared skelp, Pitts., nom.	4.50c to 5.00c

*Not determined.

SHAPES, PLATES AND BARS

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia.	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago.	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Cotton ties, Pitts., Sept.	$2.12
*Bar iron, Chicago	4.50c to 5.00c
*Bar iron, Philadelphia	4.685c to 5.185c
*Bar iron, Cleveland	4.50c to 5.00c
*Bar iron, New York	4.695c to 5.195c
*Bar iron, Pittsburgh	5.25c
*Hard steel bars, Chicago.	4.25c to 4.50c

*Not determined.

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh, base	3.75c to 4.00c
Angle bars, Chicago, base.	3.25c to 4.00c
Standard bessemer rails, mill.	$38.00
Stand. open hearth rails, mill	40.00
Light rails, 25 to 45 lbs., Chic.	70.00
Light rails, 25 to 45 lbs., Pitts.	75.00 to 85.00
Relayers, standard, mill	38.00 to 40.00
Relayers, light, Chicago	60.00
Relaying rails, light, St. L.	62.00 to 65.00
Spikes, railroad, Pittsburgh.	6.50c to 7.00c
Spikes, railroad, Chicago	5.00c to 5.25c
Track bolts, Pittsburgh	5.50c to 8.00c
Track bolts, Chicago	5.25c to 6.50c
Tie plates, Chicago	$70.00 to 75.00

WIRE PRODUCTS

(Prices of independent makers.)

(To jobbers; retailers 5 cents more.)

Wire nails, Pittsburgh	$4.00
Coated nails, Pittsburgh	4.00
Plain wire, Pittsburgh	3.95
Galvanized wire, Pittsburgh	4.65
Polished staples, Pittsburgh	4.15
Galvanized staples, Pittsburgh.	4.85
Barb wire, painted, Pittsburgh.	4.15
Barb wire, galvanized, Pitts.	4.85
Cut nails, Pittsburgh	4.50

CHAIN, PILING, STRIP STEEL

Chain, ⅜ in. proof coil, Pitts. 9.00c

Sheet piling, base, Pittsburgh 4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 9.00c to 9.50c.

Market Report Index

	Page
Weekly Market Review	629
Pig Iron	633
Ferro-Alloys	635
Merchant and Cast Pipe	635
Coke	635
Semi-Finished Steel	636
Bars	636
Structural Shapes	637
Rails, Cars, and Track Materials	637
Sheets	638
Plates	638
Scrap	644
Non-Ferrous Markets	644
Coke By-Products	675
Machine Tools	682

SHEETS

(In cents per pound.)

SHEET MILL BLACK.

No. 28, open hearth, Pitts.	8.00c to 9.00c
No. 28, bessemer, Pitts.	8.50c to 9.50c
No. 28, open hearth, Chic.	8.94c to 9.19c

TIN MILL, BLACK

No. 28, open hearth, Pitts.	8.50c to 9.50c
No. 28, bessemer, Pitts.	8.00c to 9.50c

GALVANIZED

No. 28, open hearth, Pitts.	9.25c to 11.00c
No. 28, bessemer, Pitts.	9.25c to 11.00c
No. 28, open hearth, Chic.	10.19c to 10.69c

BLUE ANNEALED

No. 10, open hearth, Pitts.	8.50c to 9.00c
No. 10, bessemer, Pitts.	8.50c to 9.00c
No. 10, open hearth, Chic.	8.69c to 8.94c
No. 10, open hearth, Phila.	8.185c to 9.185c

TIN PLATE

(Per 100 lb. box.)

Tin plate, coke base, nom. $10.00 to 15.00

IRON AND STEEL PIPE

(Prices adopted June 18, 1917.)

Steel

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
¼ to 3, butt	42	28½

Iron.

(Prices adopted June 30, 1917.)

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
⅛ to 1½, butt	33	17

BOILER TUBES

(Price adopted April 2, 1917.)

Steel, 3½ to 4½ inches, l. c. l.	34
Iron, 3½ to 4½ inches, l. c. l.	28

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	68.00 to 68.50
Six-inch and over, Chicago.	65.00 to 65.50
Four-inch, New York	68.50
Six-inch and over, New York	65.50
Four-inch, Birmingham	63.00
Six-in. and over, Birmingham	58.00

Class A pipe is $1 higher than Class B.

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	6.00c to 6.50c
Bands, Pittsburgh	6.00c to 6.50c
Shafting, Pittsburgh, carloads	5 off to list

RIVETS

Structural rivets, Pittsburgh.	5.25c
Boiler rivets, Pittsburgh.	5.35c
Tinner's rivets, Pittsburgh.	40 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius.)

CARRIAGE BOLTS

(½ x 6 inches, smaller and shorter.)

Rolled thread	40 off
Cut thread	35 and 2½ off
Larger or longer	25 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts.)

Rolled thread	40 and 10 off
Cut thread	40
Larger and longer	30
Cold pressed, semi-finished, hexagon nuts	50, 10 and 5
Gimlet and cone point lag bolts	40 and 10

NUTS

Hot pressed, square, blank	1.10 off
Hot pressed, square, tapped	1.90 off
Cold pressed, square, blank	1.50 off
Cold pressed, square, tapped	1.25 off
Hot pressed, hexagon, blank	1.90 off
Hot pressed, hexagon, tapped	1.70 off
Cold pressed, hexagon, blank	1.50 off
Cold pressed, hexagon, tapped	1.25 off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products September 26, average for August, 1917, average for June, 1917, and average for September, 1916. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Sept. 26, 1917.	Average prices Aug., 1917.	June, 1917.	Sept., 1916.
Bessemer pig iron, Pittsburgh..	$37.25	$55.55	$55.20	$22.20
Basic pig iron, Pittsburgh.....	33.95	52.25	50.20	19.075
No. 2 Foundry pig iron, Pitts.	33.95	55.55	51.025	19.50
No. 2 Foundry pig iron, Chic..	33.00	55.00	51.00	18.62
Lake Superior Charcoal, Chicago	59.50*	59.50	51.80	19.75
Malleable, Chicago	33.00	55.00	56.50	19.12
Southern, No. 2, Birmingham..	47.00*	48.00	35.75	14.38
Southern Ohio No. 2, Ironton..	55.00*	55.00	38.60	18.25
Basic, eastern Pa.....	51.00*	51.00	46.75	20.00
No. 2X Virginia, furnace.....	51.00*	51.90	46.50	17.50
No. 2X foundry, Philadelphia..	52.00*	53.40	47.50	19.75
Ferro mang., delivered.....	375.00	400.00	431.25	164.00
Bessemer billets, Pittsburgh....	70.00	93.00	93.75	45.00
Bessemer sheet bars, Pittsburgh	80.00	96.00	101.25	45.00
Open hearth sheet bars, Pitts..	80.00	96.00	101.25	45.00
Open hearth billets, Pittsburgh.	70.00	93.00	93.75	45.00
Steel bars, Pittsburgh.....	2.90	4.00	3.625	2.60
Steel bars, Chicago.....	2.90	4.50	4.50	2.79
Iron bars, Philadelphia.....	4.935	4.914	4.259	2.659
Iron bars, Cleveland, local del'y	4.75	4.75	3.50	2.40

*Not determined.

	Prices Sept. 26, 1917.	Average prices Aug., 1917.	June, 1917.	Sept., 1916.
Iron bars, Chicago mill.....	$4.50	$4.50	$4.00	$2.35
Beams, Chicago	3.00	4.94	4.63	2.79
Beams, Pittsburgh	3.00	4.50	4.00	2.60
Beams, Philadelphia	3.185	4.914	4.659	2.759
Tank plates, Pittsburgh.....	3.25	8.80	4.50	2.95
Tank plates, Chicago.....	3.25	9.59	7.92	3.19
Tank plates, Philadelphia.....	3.435	10.164	9.659	3.909
Sheets, blk., No. 28, Pittsburgh	9.00	9.00	8.137	2.887
Sheets, blue anld., No. 10, Pitts.	8.50	8.50	5.575	2.925
Sheets, galv., No. 28, Pittsburgh	10.25	10.25	9.95	4.225
Wire nails, Pittsburgh.....	4.00	4.00	3.625	2.60
Connellsville fur. coke.....	6.00	10.00	8.50	2.487
Connellsville fdy. coke, contract	12.50*	12.75	10.875	3.175
Heavy melting steel, Pittsburgh	36.00	34.60	40.00	16.125
Heavy metling steel, eastern Pa.	31.50	32.80	36.625	15.00
Heavy melting steel, Chicago...	31.00	33.10	37.00	15.50
No. 1 wrought, eastern Pa.....	44.50	46.24	47.875	21.00
No. 1 wrought, Chicago.....	36.00	35.00	41.75	16.62
Rerolling rails, Chicago.....	40.00	41.90	46.00	16.87
Car wheels, Chicago.....	31.00	30.70	37.00	12.00

(For Additional Prices See Page 690)

Pig Iron Sells on New Price Basis

Lot of 5000 Tons of Bessemer Goes at $36.30, Valley, or 10 Per Cent Above Foundry and Basic Base—Exchange Deals Also Closed—Freight Differentials to Determine District Schedules—Trade Getting Bearings

Pittsburgh, Sept. 25.—With the price of $33, valley, furnace, named by the government for basic and No. 2 foundry pig iron, the trade already has taken action to establish differentials on other grades. This was emphasized by the sale of 5000 tons of bessemer iron by a valley producer to a large consumer in the Mahoning valley at $36.30, furnace, for delivery in October. This differential of $3.30 over the government price for basic iron is estimated and is subject to revision. Amounting to 10 per cent, the spread is based on the history of the markets for both basic and bessemer iron for the last nine years, together with the difference in prices, for the first eight months of the current year. The seller of the 5000 tons of bessemer iron also traded 1000 tons of basic for an equal tonnage of bessemer on the same basis. While no transactions in other grades since the government-fixed prices have been reported, prominent producers express the opinion that malleable iron, now quoted at $53, valley, should be put on the same price level as bessemer iron, which in view of today's sale is quoted at $36.30, with the understanding that it is subject to revision. The estimated figure for gray forge by these producers, now quoted at $52 to $53, is $30, valley, while no suggestion as to the price of standard low phosphorus, now quoted at $82 to $85, has been made. One seller offers 1000 tons of forge at $33. While these figures are of a more or less arbitrary character and are subject to adjustment by the government, it is considered that at this time they are as nearly accurate as can be fixed. The final adjustment is expected to be worked out by the further conference between the committee on iron and steel products of the American Iron and Steel Institute and committees of the war industries board. The market is quiet, pending a more thorough understanding of the price-fixing program, but after this has come about, it is believed an active buying movement will develop. It seems improbable that all of the consumers will be able to secure adequate requirements up to Jan. 1, the date to which the government prices are effective. The situation, therefore, is largely a matter of distribution. Within the past week 200 tons of bessemer iron were sold at $51, valley. This indicated that this grade of iron remained firm, despite the transaction previously made, involving the sale of 2000 tons of basic iron at $42, valley. Three or four lots of No. 2 foundry and malleable iron aggregating approximately 2000 tons were sold at $52, valley, several days ago.

Heavier Buying in East

Philadelphia, Sept. 24.—With pig iron prices now fixed under government direction, consumers who have delayed their buying as long as possible have come into the market on a larger scale. Just before the new prices were announced sales of basic totaled 10,000 tons, of which around 5000 tons were taken by an eastern consumer at $45, furnace, for early shipment. In the other 5000-ton sale special considerations are understood to have figured. Sales of low phosphorus have been numerous this week and involved 5000 to 10,000 tons of standard and copper bearing iron, principally the latter. Most of this was for shipment to middle western consumers over the first half of next year. The prices done on copper

bearing iron figured all the way from $77.50, furnace, to $81, delivered at a nearby point. Sales of standard low phosphorus totaled only a few hundred tons at unchanged prices. Business in foundry was small. This business went around $50 to $51, eastern Pennsylvania furnace, for No. 2X. A small tonnage of malleable changed hands at slightly less than $54, delivered eastern Pennsylvania. Several cars of Virginia foundry were sold on the basis of $50, furnace, for No. 2X. Inquiries for several thousand tons of iron for Italy are expected to be closed shortly.

Government Action a Surprise

Buffalo, Sept. 25.—District producers profess inability to gage the effect on the market of the government price reductions, made public yesterday. They said it was too early to begin to make prognostications. The radical nature of the government decision "flabbergasted" the trade. Some had believed that the government would never take the step; that the expressed intention would have the required effect of checking the march of prices, and that this would stay the federal hand. Others who have scouted the idea of the government acting because of the supposedly endless detail involved in adjusting variant costs, were frankly dubious as to the result.

Shipments Below New Price

Cleveland, Sept. 25.—So much uncertainty surrounds the details bearing upon the new government fixed prices for iron that the market is completely at a standstill. Producers are not inclined to quote until they know more about the situation and consumers, though some of them are sorely in need of metal, are waiting to see whether they can get iron at the new price. The market promises to be stagnant until further announcements are made. While the price cut has been more severe than generally anticipated, it needs to be pointed out that the $33 level is considerably above the average figure at which shipments now are being made by the furnaces. The average shipping price in this district during the past month was $27, furnace. The average of some of the prominent makers in the district for the remainder of the year it is announced will not be over $28 to $28.50. Some furnaces still are shipping $22 orders. Reference is made to the fact that the new price will add $5.50 to the advance payment of $27.50 for the 6000 tons of foundry iron recently distributed by the navy department. On the other hand the $35 price on the 10,000 tons ordered by the Emergency Fleet Corp. is a flat one. The recent additional inquiry for 20,000 tons of foundry iron for the Emergency Fleet Corp again is active. An Ashland, Ky., consumer has been inquiring for 5000 tons of early basic. Another new inquiry calls for 800 tons of bessemer.

Chicago Market Marks Time

Chicago, Sept. 25.—Uncertainties surrounding the new pig iron price announced by the government have resulted in practical cessation of business in this district. With the fuel situation causing furnace output to fall sharply, most sellers are dropping behind on contract deliveries and for some time have not been selling prompt delivery iron, except occasional carloads to help out some melter in dire need. The effect of the $33 price will be to halt such sales and furnaces doubtless will center their efforts on shipping as heavily as possible on contracts. Prices at which iron is being invoiced run from about $28 to about $45. Contracts made several months ago for last half of this year are at the lower figure while newer contracts carry the higher quotation. No information further than press accounts of price fixing have been received by pig iron makers here and it is far from clear what is intended. Until this uncertainty is cleared business will halt. As an indication of the market previous to the government's action, Lake Superior charcoal was quoted at $58.50, furnace, with $2 freight to Chicago, on a small tonnage Monday. At the same time the Virginia Iron, Coal & Coke Co. quoted $54, furnace, with $3.36 freight to Chicago on 3 per cent silicon. Northern iron from Chicago furnaces was held at $55, furnace, up to the time of the price announcement. A recent inquiry from a wire manufacturer at Peoria for 4000 tons of basic has been withdrawn. Already buyers of castings are taking up with foundries the question of a reduction in the cost of their material.

How One Buyer Got $2 Coal Promptly

How one consumer secured all of the coal he needed at the government's new price is revealed in a story now going the rounds. He placed his order for 2500 tons of coal. The seller booked the order at the government's price of $2.

"I'll bet you $5000 that you cannot deliver this coal within 30 days."

"That bet is covered," said the seller.

A few weeks later the coal was in the buyer's yard, and the wager was settled immediately.

The price he paid for his spot coal is easy to compute.

Basic Concessions Reported

Cincinnati, Sept. 24.—Reports that some southern basic iron was sold last week at a sharp concession cannot be confirmed here. If the sale was made consumers in other territory took over the iron. Resale southern foundry iron is not being offered very freely, and except in cases where the metal already had been shipped, nothing below $47, Birmingham has been named lately. Some of the furnaces are asking as high as $50 for this year's shipment, but are disposing of only a few carloads of special analysis iron at this price. Reports from different sources indicate that the September output of foundry iron will be very much curtailed. The coke situation is causing the banking of many stacks temporarily, and labor troubles in different districts tend to make the trials of the furnace operators more acute. Buying has narrowed down to carload lots that are urgently needed. One interest in the Ironton district has been willing to take on some next year's business at $51, but now is considering the withdrawal of that price. The Ohio silvery irons are in a little better demand, with contract figures on an 8 per cent analysis quoted around $80, furnace.

Market Still Drifts

St. Louis, Sept. 25.—Apathy to a pronounced degree prevails in the pig iron market. Producers find no incentive for pressing matters, and melters are content to let things drift. The latter are making shift to supply their immediate needs, but making virtually no provision for the future. Prices for all grades and deliveries remain unchanged. No sales worthy of note were reported this week. Underlying conditions are as bullish as ever, if not more so. Consumption is phenomenally heavy, and stocks in the yards of the big plants are the smallest in more than a year. New finished business is in large volume with attractive orders being turned down in many instances because of lack of capacity.

Deliveries Delayed in South

Birmingham, Ala., Sept. 25.—Delays in delivery, a lull in buying and reduced production apparently have small effect on the southern pig iron market. car situation is again causing some trouble. Deliveries are being halted and a stacking on furnace banks again

is being noted. Reduced production is accounted for by the trouble in assembling raw material, the coke supply in particular not being up to requirements.

Price Effect

Of New Pig Iron Schedule on Pipe Prices is Awaited

New York, Sept. 25.—Makers and consumers of cast iron pipe are speculating whether the new government prices on pig iron will mean eventual reductions in this product. The foundries, however, have much iron under contract at higher prices than the schedule. The largest letting is one for 300 tons of 20-inch for Jersey City. The makers continue active in making shipments of pipe for use in United States army cantonments. Prices continue unchanged.

Active Operations in South

Birmingham, Ala., Sept. 25.—Cast iron pipe works, machine shops and foundries and other industries employing iron and steel in their operations in this district are all busy, some of them with government contracts, others with orders from the allies and still others with domestic business. Much pipe is being shipped to the northwest and middle west. As heretofore announced, the American Casting Co. has an order from France for $1,000,000 worth of cast-iron culverts for railroad work. It is generally understood that other light cast-iron work for France is being offered that maker.

Covers for 1918

U. S. Steel Takes 20,000 to 30,000 Tons of Ferrosilicon

New York, Sept. 25.—The largest single order on record for 50 per cent ferrosilicon is understood to have been placed by the United States Steel Corp. Recently, this interest put out an inquiry for all of its requirements for 1918 and indications are that all of this business now has been placed, going to the leading maker at a price lower than $120, delivered. Approximately 20,000 to 30,000 tons were involved. Sellers now are formulating their policies with regard to 1918 requirements of other consumers and indications are that the market may be established at a lower level than was expected. Several weeks ago efforts were made to put the price on 1918 business at $165, delivered. This figure never became established; in fact, it was done on only a little business on the requirements of regular customers, and $130, pipe prices are being maintained around $60 to $63 for the 6-inch and delivered, now represents the minimum. All the way up to $150, delivered, however has been done on first half of 1918 requirements and sales of a few moderate-sized lots aggregating several hundred tons for delivery over this period have been made at $150 to $155, delivered. The $130 price has figured in one or two transactions during the past few days. Current inquiries are small and generally involve lots of less than 100 tons for prompt and nearby shipment. On such business the market now may be quoted at $190 to $200, delivered.

Further efforts to take business have resulted in lower prices on ferromanganese and this product now may be quoted at $335 to $360, delivered, for shipment over the remainder of this year. Some five or six lots, aggregating 500 to 750 tons for this year, were sold at prices included in this range. Current inquiry is comprised entirely of small lots for prompt and nearby shipment and indications are that competition for this business will continue.

In spiegeleisen, the market also shows a weakening tendency. A number of small sales, involving prompt and nearby shipment, have been made during the past week at prices ranging from $77.50 to $80, furnace, and this range indicates the market for the rest of this year.

Manganese Ore Sells High

Philadelphia, Sept. 24.—Several sales of Indian and Brazilian manganese ore have been made recently at prices ranging from $1.20 to $1.25 per unit at seaboard; and a small tonnage was sold as high as $1.30.

Await British Action

Pittsburgh, Sept. 25.—Pending action by the government with regard to fixing prices for ferroalloys, the market for these products is extremely quiet. Producers and consumers both are equally hesitant about negotiating. Because of the necessity of importing these products, price fixing is unusually complicated. While the war industries board some time ago took up the question with the British government, apparently nothing has been done. It is believed, however, that Great Britain, since it and other allies of the United States are to get the benefit of reduced prices on iron and steel products made in this country, will reciprocate by lowering the price levels on alloys shipped from its possessions to America.

Coke Market is Unsettled

More Definite Information Wanted Relative to Foundry Prices and Differentials on Various Grade—Brokers Uncertain of Their Status

Pittsburgh, Sept. 25.—Pending further information on the action of the government in fixing coke prices, the market is unsettled. The price of $6, ovens, for furnace coke approved by the President, has had the effect of temporarily halting business, except for future delivery. It was reported but could not be verified that small tonnages were sold today on the $6 basis. No announcement has been made by the government of the price for foundry coke, which has been selling at about $1 above furnace fuel. Brokers are also uncertain as to what their status is, in view of the price-fixing program. It has been pointed out that with the price fixed at a flat price of $6, ovens, for furnace coke for the remainder of the year, no margin of profit is left for them and, therefore, they are apparently without any incentive to do business. The price of $6 for furnace coke, moreover, is held to be of an indefinite character, inasmuch as it does not make provision for the different grades. In this respect, the possibility that furnaces may be unable to get the standard grades they customarily use is discussed. Operators are understood to be particularly anxious to close contracts previous to the fixing of prices for delivery next year in view of the prospect that levels to be named by the government for delivery after the first of the year may be considerably lower than $8.50, at which most contracts were closed. Some contracts, however, also have been made on a sliding scale basis of 5 to 1 and 4.5 to 1 on basic iron, valley. Difficulty has been experienced by some furnaces in getting coke for prompt shipment, and this situation has been attributed largely to delayed shipments. Production of coke in the Connellsville regions for the week ending Sept. 15 was 349,675 tons, as compared with 355,987 tons for the previous week according to *The Connellsville Courier.*

Report Foundry Price Fixed

Cincinnati, Sept. 24.—Reports have been in circulation late today that the government has fixed the price of foundry coke at $6.50 at ovens and

furnace coke at $6 per net ton. What effect this will have on business is problematical. Coke is already scarce in two of the leading producing fields, and it is almost impossible to place orders with either the Wise county or Pocahontas producers for any shipment this year. New River producers are not much better off. The proposed regulation does not cover old contracts so that blast furnace operations are not apt to be curtailed at any nearby date. Spot foundry coke brought as high as $15 in the Connellsville district last week.

Negro Labor is Returning

Birmingham, Ala., Sept. 25.—Coke production in the south is improving steadily, but is far from being satisfactory or such as to warrant the taking on by producers of any new business. Coal mining conditions in Alabama also are improving, 80 per cent normal output now being reported, with prospects bright for a still better showing by the end of the week. Labor is more plentiful in this district. Many of the negroes who were in the exodus during the past 12 months to Kentucky, Illinois, West Virginia, and even Pennsylvania, now are returned and applying for work in the mining section. This labor is most acceptable and is filling an urgent want. Union labor is quiet, though it is not improbable that before many days there will be another agitation on for recognition of the organization and other demands.

Shell Steel

Inquiries Appear in Eastern Market Again—Allies' Policy Uncertain

New York, Sept. 25.—Brokers and middlemen in this city for the first time in months again are showing interest in shell steel. One broker during the past week put out an inquiry for 25,000 tons of 3-inch to 7-inch shell rounds, another broker inquired for 6000 tons of 5⅜-inch billets for 6-inch shells and several other like inquiries have come to the attention of the mills. All of this steel is specified to British standards. Careful investigation of reports that the allies again are about to place large orders for shells in this country cannot be verified. Interests which in the past have directed or participated in the placing of British shell business in this country, have received no information which would intimate that there is any truth in them.

Sold Before Price Action

Philadelphia, Sept. 24.—Prior to the announcement of the government prices sales of semifinished steel including one lot of several thousand tons of open-hearth rerolling billets for export were closed at $85, Pittsburgh. A lot of several thousand tons of soft rerollers since has been offered for export at $65, tidewater.

Market at Standstill

Pittsburgh, Sept. 25.—In the absence of government prices being fixed on billets and sheet bars by the government, producers of these products report that the market is at a standstill. Until the government has named levels, the same prices that have been heretofore prevailing are quotable, but may be considered nominal. The differentials between billets and sheet bars and other commodities are expected to be established soon along with those on other products whose prices have not been fixed. In the meantime, to suggest prices is considered to be based on the merest speculation. Differentials which are made applicable in ordinary times, it is pointed out, might be entirely out of line today, because of the increased wages, higher cost of raw products and other elements entering into the situation.

Few Cancellations Shown

Pittsburgh, Sept. 25.—Producers of cold rolled strip steel report that the government's price-fixing program has had but little effect in the way of causing private buyers to cancel contracts. Price on cold rolled strip steel are expected to be announced soon. Present quotations range from 9c to 9.50c, base. Producers are so filled with orders that it is doubtful if they will be able to offer much tonnage to the private trade this year.

Big Inquiry Was Current

Cleveland, Sept. 25.—An inquiry for 60,000 tons of sheet bars for an eastern consumer has been before local producers the past week. It is believed, however, this represents the business of such amount which was covered by a contract placed with a Mahoning valley maker as reported in THE IRON TRADE REVIEW last week. Quotations prior to the government announcement had continued at $90, mill, for open-hearth sheet bars. Early in the week a sale of bessemer slabs to a local consumer at $80, mill, was closed. Local consumers have been inquiring for wire rods for last quarter.

Offer Spanish Ore

Philadelphia, Sept. 24.—A cargo of approximately 7000 tons of high grade Spanish low phosphorus iron ore now in this port has been offered during the past week at 39c per unit.

Bars for France

Heavy Inquiries for Shipment Abroad Are Appearing

New York, Sept. 25.—A new development in the export demand for iron and steel is the appearance of inquiries for large tonnages of steel bars for France. These are coming out from individual French consumers and it is not known for what purpose the bars are wanted. The largest single inquiry calls for 10,000 tons of rounds, ranging all the way up to 8 inches in diameter, another French inquiry calls for 7000 tons of ¾-inch rounds, another for 500 tons, another for 3000 tons, and several for 2000 tons and less each. Inquiries for bars for other countries also are more numerous. Japanese buyers in particular are anxious to obtain large tonnages of this product, principally rounds.

Situation is Muddled

Chicago, Sept. 25.—Announcement that the government has fixed the prices of soft steel bars at 2.90c, Pittsburgh and Chicago, has given the market an air of temporary uncertainty until the detailed announcement can be digested. This is the same price made to the government for bars to be used on definite projects. Practically nothing has been doing on this product for some time, but it is expected a heavy demand will develop on the part of consumers now that the price has been set. Recent sales have been at 4.69c, Chicago. Bar iron remains steady at 4.50c, Chicago, and contracts are being specified in full. Users apparently do not care to buy for 1918 delivery at the present price. Whether the price of steel bars will affect the quotations on bar iron is not yet apparent. Hard steel bars continue at 4.25c to 4.50c, Chicago, but sales are for small tonnages, mostly carloads. Some mills in this territory ordinarily rolling hard bars have been rolling soft steel bars from billets recently, which has reduced the output of carbon steel.

Buys Gun Barrel Stock

Youngstown, O., Sept. 26.—Government buying still prevails in this territory for shell steel, various sizes of pipe, plates, etc. The latest order to come out and which is now being filled is for 1500 tons of gun barrel steel. The sale was made at 10c.

Specify for Shafting

Pittsburgh, Sept. 25.—Specifications against shafting contracts by private consumers are heavy. Good-sized tonnages for early shipment also are being bought for private consumption.

The government continues to place large orders for shafting but producers find themselves able to take care of the requirements of private buyers in fairly good shape. Automobile and implement makers are most active in specifying against contracts. Sales of shafting are being made at 10 per cent off to list for the larger tonnages and 5 per cent off for smaller ones.

Rail Prices

Still to be Indicated by Government—Have Been Provisional

Pittsburgh, Sept. 25.—Fair-sized tonnages of light rails are being inquired for by the government for shipment to France. Private buying continues to be at a standstill. The government's order placed some time ago for 150,000 tons of standard rails for track construction in France has been completed by some of the mills and nearly so by others. It is not known whether the government will announce prices for steel rails. Orders which it has placed have been on a tentative price basis and it has been shown that the cost of production by some large consumers has been in excess of the provisional figures named by the government. Aside from rather large orders placed by the government for spikes, the market for this product is becoming quiet, after some buying by jobbers for prompt delivery at 7c base.

Buying is Very Light

Chicago, Sept. 25.—Continued absence of inquiry for railroad cars makes that market unusually dull. The Seaboard Air Line is asking figures on 500 flat cars, and the usual inquiry for cars for the Russian government persists but is not regarded as much of a factor.

It is understood that No. 2 rails have been sold recently on a basis of $60, Chicago, for use in side tracks and elsewhere. No business is being done on standard No. 1 rails and the quotation of $38 and $40 for these rails is purely nominal. Demand continues for light rails for mining and industrial purposes and deliveries of six months are being offered.

The Hesse-Martin Iron Works, Portland, Oreg., engineer, founder and machinist, through R. M. Hoffman sales manager, advises that a new plant now is being built consisting of an 80 x 125-foot machine shop, an 80 x 100-foot foundry, a blacksmith shop and an office; also, that all initial equipment requirements have been provided for.

Fabricators Seek Steel

Private Inquiry is Heavy But Steel Not Yet Available at New Price —More Tonnage for Military Buildings

Pittsburgh, Sept. 25.—Fabricators report that they are receiving inquiries from private buyers for fair sized tonnages and are, in many cases, unable to get the steel. The government's price fixing program has left them uncertain as to what they shall do with regard to prices, as some have taken contracts without having covered steel requirements. They report that it is not yet possible to obtain material at the price of 3c, Pittsburgh, named by the government for shapes. The government continues to place heavy orders for buildings to be constructed in France. One contract just placed with the McClintic-Marshall Co., Pittsburgh, involves 400 tons.

Let Military Contracts

New York, Sept. 25.—Contracts for 32 buildings on which the Stone & Webster Engineering Corp. recently took bids, were let by government officials at Washington last week. These structures, which will be used for military purposes in France, were let in accordance with the ability of the fabricators to make shipment. Each building will require approximately 430 to 450 tons of steel, making a total of around 14,000 to 15,000 tons. Contracts for the buildings were distributed as follows: United States Steel Products Co., 8; Hay Foundry & Iron Works, 6; Levering & Garrigues, 1; McClintic-Marshall Co., 1; Hedden Iron Construction Co., 4; Belmont Iron Works, 4; L. F. Shoemaker & Co., 3; Ferguson Iron & Steel Co., 1; Eastern Bridge & Structural Co., 1; Decatur Bridge Co., 3.

More War Steel Needed

Philadelphia, Sept. 24.—Present indications are that some of the fabricators who obtained contracts last week for buildings for United States army use in France will have some difficulty at first in obtaining their steel. These buildings were awarded in accordance with the ability of the fabricators to make quick deliveries. It develops that some of the mills in granting protection did not expect awards to be made in all cases, so that they have been forced to disappoint some of the contractors and these interests now are scurrying around for good-sized tonnages. With the exception of this business the structural market is quiet, although fabricators and mills expect shortly to be furnishing large quantities of steel for the construction of vessels for the Emergency Fleet Corp.

Order Tonnage at New Prices

Cleveland, Sept. 25.—Local builders have distributed under government direction to makers in the Pittsburgh and Chicago districts, about 2200 tons of structural material covering the requirements for building 45 to 50 cranes for use in France. This business was placed at the new agreed prices for plates, shapes and bars. This order probably will be increased. Fabricating shops in this territory are interesting themselves more actively in government work. One of them is figuring on two jobs requiring 1500 tons each. It is understood that the design for 5000-ton standardized ships which the Emergency Fleet Corp. will order in large numbers has been accepted and awards for fabricating material in large quantities are expected to be distributed soon. The 10,000-ton design is booked for early adoption. The city of Cleveland has deferred action on additions to the municipal lighting plant because it has been unable to obtain reasonable delivery on the steel amounting to about 1000 tons.

Government Places Orders

Chicago, Sept. 25.—Practically the only business offered in structural tonnage in the western market recently is for the government, to be used in erecting buildings for military use in France. One fabricator in this territory figured recently on about 1200 tons for three such structures, and it is understood about 30 buildings are to be erected for this purpose. Other business has involved tonnages considerably less than 200 tons each and practically all is for industrial purposes. Fabricating shops continue to run at light schedule and feel that the end of their bookings is approaching rapidly. Expectation that the government would offer some additional business for use in building emergency ships has not yet been realized.

CONTRACTS PLACED

Power house for National Sugar Refining Co., Yonkers, N. Y., 600 tons to Hedden Iron Construction Co.

Musical Protective Union building, New York, 350 tons, to A. E. Norton & Co.

Bridges for Pennsylvania railroad, 1100 tons, to independent fabricators.

Plant for Spring Perch Co., Stamford,

Conn., 400 tons, to Eastern Bridge & Structural Co.

Garage and foundry at Watertown arsenal, 1300 tons to leading fabricator.

Power house for Niles-Bement-Pond Co., Plainfield, N. J., 200 tons, to Guerber Engineering Co.

Twelve panel roof truss for the Avery Co., Peoria, Ill., 189 tons, to Christopher & Simpson Co., St. Louis.

Mineral Creek bridge near Ray, Ariz., for the Ray & Gila Valley railroad, 156 tons to the American Bridge Co.

Structural steel for wedge flue system for the Ohio & Colorado Smelting & Refining Co., Salida, Colo., 139 tons, to independent shop.

Plant at Denver, Colo., for the Linde Air Products Co., 106 tons to the Union Foundry Co., Chicago.

Storehouse at St. Julien's Creek, Va., for the United States government, 105 tons, to the Kellogg Structural Steel Co., Buffalo.

CONTRACTS PENDING

Model storage building, Washington navy yard, 200 tons, Penn Bridge Co. low bidder.

New Sheet Prices

Will Probably Be Announced Within Next Few Days

Youngstown, O., Sept. 26.—Sheetmakers in the Mahoning valley state that while inquiries for various grades of sheets are heavy, little business is being placed. One producer says that the tonnages closed with his concern during the past two or three days were small lots and ranged from 50 to 200-ton lots. A medium-sized tonnage of galvanized No. 28 was taken by the French government at 10.75c. Washington is still buying black sheets. The purchase price is understood to be the previously quoted figure of 6.50c. Most sheetmakers expect that in the near future large tonnages for all grades of sheets required by the government will be placed in this territory. On the strength of this, rolling schedules are so arranged that government work will be started upon as soon as specifications are received.

Prices have undergone some readjustment the past week and are quoted as follows: Blue annealed, No. 10 gage, 8c to 8.50c; black, No. 28 gage, 8.50c to 8.75c; painted corrugated, 8.70c to 8.95c; tin mill black, No. 28 gage, 8c to 9c; galvanized, No. 28, 10c to 10.50c; corrugated galvanized, No. 28, 10.05c to 10.55c. These are f.o.b., Youngstown. All export business noted was at a 25c premium. No sales of billets or sheet bars are recorded, although it is asserted soft billets can be bought in this district for $80 and sheet bars at from $85 to $90. In regard to the steel prices fixed by the government and manufacturers last week no price was set on sheets owing to the amount of time required for the adjustment of figures applying to raw materials. However, it is expected that sheet prices will be named this week.

Market Grows Softer

Pittsburgh, Sept. 25.—With buying for private consumption extremely limited, the market for sheets appears to be softer. Small tonnages, however, are moving at prices somewhat below those which have been mentioned heretofore. Some of the sales are made from stock and would indicate that blue annealed No. 10 is quotable at 8c to 9c; black sheets No. 28, 8.50c to 9c, and galvanized sheets No. 28, 9.25c to 11c, Pittsburgh. These figures are reported to be slightly above those named by some producers. With the government fixing prices, private buyers apparently are of the belief that they will be able to get sheets at lower levels than those which have been prevailing, and are expected to come into the market actively once the price situation is cleared up. Difficulty will be experienced, however, in getting tonnages and satisfactory deliveries, and in many cases it is apparent that adequate supplies will not be available for all of the buyers. The government so largely dominates the sheet market that private consumers are forced to be given second consideration. Moreover, it is understood that considerable sheet bar capacity will be diverted to the production of other kinds of materials for the government. The government is understood to be paying something under 9c for No. 28 gage galvanized sheets, about 2 cents less for blue annealed No. 10, and 1½ cents less for black sheets No. 28.

Prices Are Weaker

Chicago, Sept. 25.—Although important makers of steel sheets are holding quotations firm at previous levels, indications are that some selling is being done at lower prices. In spite of this the market is not yielding to this competition and material is being moved at a higher price. The quotations held by larger makers are 8.94c to 9.19c, Chicago, for No. 28 gage black; 8.69c to 8.94c, Chicago, for No. 10 gage blue annealed, and 10.19c to 10.69c, Chicago, for No. 28 gage galvanized. Just how far these figures are being shaded has not yet developed.

Expect Large Plate Orders

Mills Believe New Federal Price Will Release Flood of Private Inquiries—Little Tonnage Available for Regular Customers

Pittsburgh, Sept. 25.—With the price of plates reduced from 8c to 3.25c, Pittsburgh, the trade expects a large volume of inquiries from private buyers. At the same time it is recognized that the government orders are so large that capacity for private consumption has been greatly curtailed and difficulty may be experienced by private buyers in getting allotments during the remainder of the year. One prospective source of buying is from the railroads for additional rolling stock. Sales during the past week have been extremely limited. Most of the tonnages sold involve small lots and were made on a basis of 8c, Pittsburgh, for prompt shipment.

Seek United States Business

Philadelphia, Sept. 24.—Many of the smaller consumers of steel plates have had so much difficulty of late in securing deliveries as to be threatened with shutting down. These interests now are lining up to do government business since they cannot get material for their regular work. Some of them now are working on orders for boilers for merchant vessels, the Emergency Fleet Corp. supplying them with steel. Government requirements are keeping eastern Pennsylvania mills pretty busy and these interests can spare little steel for private use. While numerous inquiries for steel for ordinary purposes have been presented during the week, practically all of them were turned down.

Considering High Priced Contracts

Cleveland, Sept. 25.—Holders of 10 cent and other higher price plate contracts in this territory yet unspecified are wondering how they will fare with these commitments under the new government prices. The general opinion in the trade, however, has been that the schedule determined upon will not be retroactive either as to unspecified contracts or unshipped specifications. There has been some talk of cancellation of high priced contracts but nothing definite in this direction has developed Some direct government business on plates for cranes was placed in this territory at the new price of 3.25c, Pittsburgh. Another order for 500 tons of stamping plates for indirect government requirements was placed early in the week at 8c, mill. The position of local plate makers who buy their slabs is interesting under the new conditions.

1000 Foundrymen Meet at Boston

Annual Convention of American Foundrymen's Association and American Institute of Metals and Huge Exhibit Attract Leaders of Industry From All Parts of the Country

BOSTON, Sept. 25. (By wire.)—The close of the second day of the annual convention of the allied foundry associations finds close to 1000 members registered. The annual convention of the American Foundrymen's association and the American Institute of Metals opened yesterday afternoon, so that the total attendance is expected to pass the 1000 mark before adjournment on Friday.

Today prominent members of the resolutions committee, headed by Henry A. Carpenter, General Fire Extinguisher Co., Providence, R. I., were considering a resolution in which the foundrymen's association would place itself on record as opposed to price fixing by the government without corresponding wage protection for manufacturers, and pointing out that producers, otherwise, are at the mercy of irresponsible labor profiteers.

John H. Fahey, a member of the committee of the chamber of commerce of the United States on co-operation with the council of national defense, today officially invited the American Foundrymen's association to appoint a committee to represent the foundry industry in all negotiations with the government. The reports of the committee advisory to the United States bureau of standards, and the committee on the classification of technical literature were unanimously accepted. Papers by H. R. Atwater, Osborn Mfg. Co., Cleveland, and by F. J. McGrail, Struthers-Wells Co., Warren, Pa., on "Co-operation Between Engineer and Foundryman", excited interesting discussion in which Stanley G. Flagg, Stanley G. Flagg & Co., Philadelphia; J. W. Langston, G. & C. H. Hoskins, Ltd., Sydney, Australia; Richard Moldenke, Watchung, N. J., and others participated. Papers also were presented by W. B. Hunter, Fitchburg high school, Fitchburg, Mass., and Judson Kibby, Cleveland. A paper by James A. Fitzgerald, Reno, Pa., was read by title.

Institute of Metals

A number of interesting papers were read at the opening session of the American Institute of Metals today. G. H. Clamer, Ajax Metal Co., Philadelphia, discussed a new type of electric furnace, which has proved very successful in melting yellow brass scrap, especially turnings, grindings and finely divided material, thus conserving the supply of new materials. This furnace is of the tilting type, resembling an ordinary brass furnace. The proper pouring temperature of the brass is indicated by the jerking of needles of recording instruments.

Another electric furnace paper was read by Dwight D. Miller, Society for Electrical Development, New York. Electric furnaces to the number of 471 are now in use in all parts of the world. Mr. Miller described a number of different types of furnaces, including the Northrup induction furnace which can be used with or without crucibles.

The nominating committee, headed by Louis F. Olsen, Ohio Brass Co., Mansfield, O., will report on Friday.

Foundrymen Cordially Greeted

The registration of members and guests of the allied foundry associations began in Mechanics' building, Monday morning at 10 o'clock. In the afternoon, the exhibit, comprising machinery and foundry equipment displayed by nearly 200 manufacturers, was opened. At 3 o'clock the joint opening session of the American Foundrymen's association and the American Institute of Metals was held in Paul Revere hall. J. P. Pero, president of the American Foundrymen's association, was chairman. In the address of welcome, Hon. James M. Curley, mayor of Boston, expressed an appreciation of the work which the foundry societies are doing, and assured the assembled manufacturers that a spirit of cordial co-operation toward the casting industry prevails in Boston. R. A. Bull, Duquesne Steel Foundry Co., Pittsburgh, responded to Mayor Curley's address and referred to the important part played by Boston and New England in the foundry industry. J. P. Pero, Missouri Malleable Iron Co., and Jesse L. Jones, Westinghouse Electrical & Mfg. Co., East Pittsburgh, Pa., delivered their annual presidential addresses.

J. P. Pero, Missouri Malleable Iron Co., East St. Louis, Ill., president of the American Foundrymen's association, introduced the annual presidential address by referring to the New England Foundry Foremen's association, organized in Springfield, Mass., in 1887. This organization was the first foundrymen's society ever formed and numbered in its membership the leading foundry foremen of the period in New England.

Continuing, Mr. Pero said: "As foundrymen, we point with pride to the wonderful progress made in foundry practice in the past 25 years and as members of the American Foundrymen's association we are justly proud of the prominent part our society has played in contributing to the present state of excellency . . . . I predict that those who attend the sessions 25 years hence, will marvel at the gigantic strides made during that period, even as we now in retrospect wonder at the progress already made.

"As an association, we can do much toward the successful conduct of the war. As individuals, we can do more. There must not be any slackers among us. It is time for action.

Compliments Association

In the report of the board of directors of the American Foundrymen's association some interesting correspondence between officers of the association and government officials is disclosed. This correspondence shows that the Washington officials are heartily in accord with the work being done by the association. It developed that the lack of trained army officers prevented the war department from granting the request that a government exhibit be made at the Boston convention. Letters from Newton D. Baker, secretary of war; Howard E. Coffin, council of national defense; William Crozier, chief of ordnance, U. S. A.; and others were read. The report also contains the minutes of three meetings of the board of directors which were held during the past year, and a statement regarding the department of exhibits, submitted by C. E. Hoyt.

The annual report of the secretary-treasurer shows that the total membership of the American Foundrymen's association is 1017. Of this number, 877 are active members, 124 are associate members and 16 are honorary members. During the year 1916-1917, 147 new members, of which 124 were active and 23 associate, were received. The report shows that the finances of the association are excellent.

Government Plan Satisfies Industry

Spirit of Loyal Accommodation to New Conditions Apparent in All Directions—Prices Will Not Be Retroactive—Further Schedule Being Worked Out Covering All Products—Plan of Distribution

WASHINGTON, Sept. 26.—No intention of interfering with the existing contracts for iron and steel, many of which are at prices far above the new agreed schedule, is being entertained by the government. This has been made clear in official circles. Unless someone attempts to back out of contracts for war material, nothing is likely to be done by the government in this direction. This question as to the bearing of the new prices on the old contracts has been one of the most important involved in the price-fixing program.

Determination of the prices that shall prevail on other products not included in the original announcement of the President now is under way. This action will pertain to various grades of pig iron other than valley No. 2 foundry and basic covered by the $33 base figure and the schedules that will prevail in different producing districts. Present freight differentials over valley points are expected to be used as the basis for these adjustments. Similarly prices on semifinished steel, scrap, sheets, tubular goods, wire and other products are to be fixed under extras and differentials usually allowed. Announcement of these prices within a few days is awaited.

The Plan of Distribution

Distribution of new iron and steel orders to the domestic trade at the official prices in all probability will be under the direction of the priorities committee acting with the advice of J. L. Replogle, steel advisor to the government. Alexander Legge, who is acting in a somewhat similar capacity with Mr. Replogle, will devote his attention to the handling of European shipments.

R. S. Lovett, chairman of the priorities committee of the war industries board, has announced the priority regulations applying to iron and steel products. Licenses will be required for manufacturing material under contracts for actual war and semiwar purposes. Other work will not require certificates. These regulations, which are based on the English plan, are as follows:

Under regulations all orders and work will be divided into three classes:

Class A comprises work urgently necessary in carrying on war, such as arms, ammunition, ships, etc., and materials required in manufacture.

Class B comprises orders and work which, while not primarily designed for the prosecution of war, yet are of public interest and essential to national welfare or otherwise of exceptional importance.

Class C comprises all orders and work not embraced in class A or class B.

All orders henceforth will be classed as class C unless covered by certificates of priorities committee. No certificates will be issued for Class C orders. Orders and work in Class A will take precedence over those in Class B and both classes will be given priority over Class C irrespective of date when the orders were received. Class A and Class B will in turn be separated into subdivisions to be designated as Class A1, A2, A3, A4, etc., and Class B1, B2, B3, B4, etc. Each will be composed of orders within the class which are regarded respectively as of greater moment and are to be given precedence in accordance with serial number. All materials required in manufacture of an article or in prosecution of any work will be entitled to take the class of such article or work unless otherwise specified. For the administration of the regulations, certificates will be issued by the committee upon application, specifying classification of the order. Certificates of a subsidiary nature will be issued upon request, for the furnishing of material and articles required in manufacturing the article or prosecuting the work ordered. War orders of allies as well as of United States will be placed in Class A in the case of those already contracted for. All orders placed prior to the date of the circular by the war and navy departments or Emergency Fleet Corp., will be classed as subdivision A1 of Class A unless otherwise ordered. Orders already placed by allies for war materials will be classed as subdivision A2 of Class A, unless otherwise ordered.

Applications for Class A certificates will be made to committee by contracting office or agency of United States, or in case of allies by their authorized agents. Applications for subsidiary certificates covering materials, articles or work required in the manufacture of Class A products will be made by the contractor to whom principal Class A certificate has been addressed. Applications for Class B certificates will be made to committee by individual, firm, or corporation for the expedition of whose contract the priority order is desired while subsidiary certificates for materials, as in the case of Class A certificates, will be applied for by the contractor to whom principal Class B certificate has been addressed."

Judge Lovett has organized his priorities committee to include Major Gen. J. D. Aleshire, Rear Admiral N. E. Mason, Geo. Armsby, Edwin B. Parker, J. Leonard Replogle and Rear Admiral A. V. Zane. R. T. Demsey will be secretary.

In connection with the announcement of the price schedule, the following official statement was issued by the President:

"It was stipulated first that there should be no reduction in the present rate of wages; second, that the prices above named should be made to the public and to the allies as well as to the government; and, third, that the steel men pledge themselves to exert every effort necessary to keep up the production to the maximum of the past, so long as the war lasts.

"Measures will be taken by the war industries board for placing orders and supervising the output of the steel mills in such manner as to facilitate and expedite the requirements of the government and its allies for war purposes and to supply the needs of the public according to their public importance and in the best interest of all, as far as practicable.

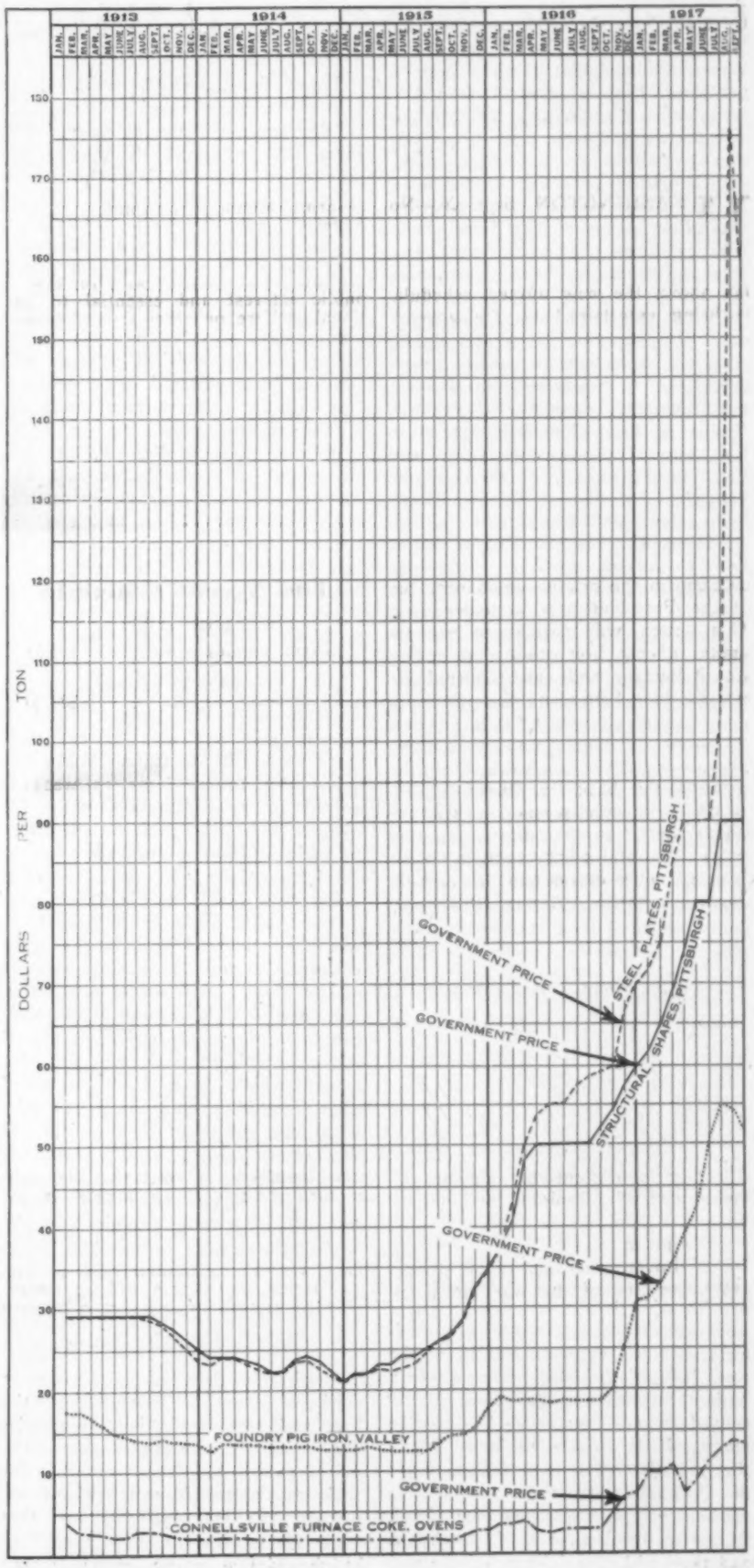
"A spirit of co-operation was manifested by the steel men and no doubt is entertained that every effort will be made to bring the production as nearly as possible up to the extraordinary demands resulting from the war."

Among the representative business men who attended the meeting were: F. B. Baird, president, Buffalo Union Furnace Co., Buffalo; D. B. Bennett, vice president, Pittsburgh Steel Co.,

The Agreed Schedule

IRON ORE	
Mesabi, nonbessemer	$ 5.05
PIG IRON	
No. 2 foundry, valley	$33.00
COKE	
Connellsville, ovens	$ 6.00
FINISHED STEEL	
Plates, Pittsburgh and Chicago	$ 3.25
Shapes, Pittsburgh and Chicago	3.00
Steel bars, Pittsburgh and Chicago	2.90

Pittsburgh; Frank Billings, president, Tod-Stambaugh Co., Cleveland; L. E. Block, president, Block-Pollock Co., Chicago; C. J. Blue Jr., vice president, Carbon Steel Co., Pittsburgh; James B. Bonner, representative, United States Steel Corp., Washington; J. A. Campbell, president, Youngstown Sheet & Tube Co., Youngstown, O.; E. A. S. Clarke, president, Lackawanna Steel Co., New York City; A. H. Cordery, general sales manager, Phoenix Iron Co., Philadelphia; James A. Crowley, president, James A. Crowley & Co., New York; H. G. Dalton, of Pickands, Mather & Co., Cleveland; W. B. Dickson, vice president, Midvale Steel & Ordnance Corp., New York; J. G. Deericks, assistant sales manager, Pittsburgh Steel Co., Pittsburgh; W. H. Donner, president, Donner Steel Co., Philadelphia; C. D. Dyer, vice president, Shenango Furnace Co., Pittsburgh; J. A. Farrell, president, United States Steel Corp., New York; W. J. Filbert, comptroller, United States Steel Corp., New York; Charles A. Fisher, treasurer, Jones & Laughlin Steel Co., Pittsburgh; A. A. Fowler, of Rogers-Brown Iron Co., New York; J. H. Frantz, vice president, Columbus Iron & Steel Co., Columbus, O.; E. H. Gary, chairman, United States Steel Corp., New York; F. H. Gordon, general sales manager, Lukens Steel Co., Coatesville, Pa.; E. G. Grace, president, Bethlehem Steel Co., South Bethlehem, Pa.; D. D. Hall, vice president, Virginia Iron, Coal & Coke Co., Roanoke, Va.; F. J. Hall, vice president, Central Iron & Steel Co., Harrisburg, Pa.; H. F. Holloway, sales manager, Jones & Laughlin Steel Co., Washington; J. M. Hanson, president, Forged Steel Wheel Co., Pittsburgh; W. S. Horner, president, National Association of Sheet and Tin Plate Mfrs., Pittsburgh; A. F. Huston, president, Lukens Steel Co., Coatesville, Pa.; C. L. Huston, vice president, Lukens Steel Co., Coatesville, Pa.; H. R. Jones, of United Alloy Steel Corp., Canton, O.; Willis L. King, vice president, Jones & Laughlin Steel Co., Pittsburgh; Robert C. Lee, secretary, Robesonia Iron Co., Philadelphia; C. E. Lenhart, president, Century Coke Co., Uniontown, Pa.; W. W. Lukens, secretary, Alan Wood Iron & Steel Co., Philadelphia; Price McKinney, president, Corrigan-McKinney Co., Cleveland; Charles McKnight, president, Carbon Steel Co., Pittsburgh; W. E. Manning, vice president, Youngstown Sheet & Tube Co., Youngstown, O.; W. G. Mather, president, Cleveland Cliffs Iron Co., Cleveland; E. W. Mudge, of Claire Furnace Co. and Ella Furnace Co., Pittsburgh; L. F. Nagle, president, Nagle Steel Co., Pottstown, Pa.; John C. Neale, vice president, Mid-



vale Steel Co., Philadelphia; John B. Newton, president, Virginia Iron, Coal & Coke Co., Roanoke, Va.; A. Pardee, president, Pardee Steel Works, Philadelphia; Leonard Peckett, president, Empire Steel & Iron Co., Catasauqua, Pa.; William Pigott, first vice president, Pacific Coast Steel Co., San Francisco; W. S. Pilling, president, Northern Iron Co., Philadelphia; H. H. Pleasants, of United Alloy Steel Corp., Canton, O.; Veryl Preston, president, Eastern Steel Co., New York; R. A. Rainey, managing trustee, estate of W. J. Rainey, New York; William H. Reeves, vice president, Phoenix Iron Co., Philadelphia; J. V. W. Reynders, chairman, American Tube & Stamping Co., Bridgeport, Conn.; F. B. Richards, of M. A. Hanna & Co., Cleveland; James P. Roe, general manager, Glasgow Iron Co., Pottstown, Pa.; Charles M. Schwab, chairman, Bethlehem Steel Corp., South Bethlehem, Pa.; William T. Shepard, treasurer, Rogers-Brown Iron Co., Buffalo; E. E. Slick, vice president, Cambria Steel Co., Philadelphia; F. K. Smith, vice president, Valley Mould & Iron Corp., Sharpsville, Pa.; W. P. Snyder Jr., vice president, W. P. Snyder & Co., Pittsburgh; Scott Stewart, general manager, estate of W. J. Rainey, New York; W. A. Thomas, president, Brier Hill Steel Co., Youngstown, O.; John A. Topping, president, Republic Iron & Steel Co., Youngstown, O.; S. M. Vauclain, vice president, Standard Steel Works, Philadelphia; C. P. Wheeler, of Pickands-Brown Co., Chicago; and H. D. Westfall, vice president, La Belle Iron Works, Steubenville, O.

Makers Think Prices Fair

Judge E. H. Gary:—The base prices for iron ore, pig iron and the leading steel productions in which the government is specially interested, as fixed by the President, while much lower than the prevailing market prices and considerably below the expectations of the manufacturers, yet, on the whole, taking everything into consideration, I believe are fair and reasonable and come within the conditions named by the President in his proclamation issued last June. These prices were probably made in accordance with the recommendation of the war industries board, who gave a patient hearing to the steel representatives and made an exhaustive study of the whole subject. While the manufacturers may feel a sense of disappointment they nevertheless appreciate the courteous and frank treatment on the part of the board and they will cheerfully acquiesce and do everything possible to maintain production to the maximum so long as the war continues; and they will not decrease the wages of their workmen under present conditions.

James A. Campbell, president of the Youngstown Sheet & Tube Co.: "The prices already announced will meet with approval throughout the country as far as the larger producers of steel commodities and the commercial trade are concerned. While some of the prices named are a little lower than was at first expected yet taking everything in consideration I believe they are reasonable. Of course other commodities entering into the manufacture of the finished product will have to be considered. For instance, the mills in order to turn out a desirable product must first be in fit condition. This applies to blast furnaces and open hearths as well, and in case repairs are necessary on any units turning out iron and steel at the new prices, the material entering into the repairs, such as refractories, etc., must necessarily undergo a readjustment also. However, taken as a whole, I believe the prices are entirely satisfactory."

E. A. S. Clarke, president of the Lackawanna Steel Co., said: "The steelmakers now are able to cut their cloth to fit the measure. While the prices are not as large as was expected in some quarters, they are high enough to enable the producers to maintain output at current levels. Steel men have the opportunity of doing their bit in keeping their production on a scale great enough to win the war, and this is the most important thing. There are a number of old steel plants whose production costs are so high that not much profit can be made at the price mentioned by the President, and there are also plants which have been reopened after long idleness, in order to take advantage of the high prices of the last two years whose operations may be adversely affected. But, taking the industry as a whole, I should say that the returns promised by the fixed prices were satisfactory."

Pittsburgh Takes Prices With Good Grace

Pittsburgh, Sept. 25.—Exhibiting a spirit of complete co-operation, the iron and steel trade in this district has accepted with good grace the prices named by the government for their products. Almost without exception, the manufacturers say that while the figures are lower than they had hoped for, yet on the whole they are considered to be fair and it is believed they will make it possible even for the small producers to net profits.

Although manufacturers were not in accord with the plan to have the government fix prices for the general public, they did not combat this proposal, which some are inclined to believe cannot be worked out practically. The clearly defined position of the government that prices named will not affect existing contracts was reassuring. There was virtually no opposition to the fixing of uniform prices for the allies.

It is evident that the price-fixing program, much of which yet remains to be worked out, will result in complications and perplexities. For instance, it has been pointed out that a producer of semifinished or finished products who has not contracted ahead for the sale of his products, but at the same time has purchased raw materials such as pig iron at the previously high prevailing levels, will find himself unable to manufacture products at the prices named by the government. The committee on iron and steel products of the American Iron and Steel institute and committees of the council of national defense are expected to resume conferences soon in Washington to fix prices on semifinished and finished products, on which levels have not yet been named. These concern such products as billets and sheet bars, sheets, iron and steel pipe. Also no price has yet been fixed on scrap.

Outlook Optimistic

That the iron trade will be able to readjust itself to the new situation is not doubted. Manufacturers are well booked in most lines and it is problematical as to whether a great amount of new business can be taken for private consumers during the remainder of the year. It seems probable, however, that a large volume of new inquiries for domestic consumption will develop at once. One source of new business that it may develop is from the railroads, which are expected to place requirements for rolling stock. Specifications against contracts seem to have been curtailed somewhat. Cancellations of contracts have been so slight as to be unimportant. It will take some time to tell just what the position of the private consumer will be.

The price of $6, ovens, fixed for furnace coke is viewed generally as being fair. Operators have expressed themselves as being satisfied and do not think that it will in any way curtail production.

Announcement Stimulates Inquiry at Chicago

Chicago, Sept. 25.—Announcement of new prices on iron and steel made by the government has been greeted in Chicago by full desire to conform to the conditions. However, so little information has accompanied the announcement that both makers and consumers feel that the uncertainty surrounding the situation has been increased. Most makers and sellers believe that consumers will continue to specify against their contracts rather than to let them lapse and seek to make new contracts at the revised prices. In the latter case, the consumer would place the time of his delivery much further in the future, and ability to obtain steel in most instances is of more importance than prices.

Considerable importance is attached to the announcement of plans to handle priority of shipments. Should the tonnage required by the first and second, or the direct and indirect, classes be sufficient to absorb full output or nearly so, buyers of the third class would have small chance to obtain steel. As a result of this situation, it might readily come about that many existing contracts would be pushed so far into the future that they would be rendered useless.

One development is the probable disappearance of all premium prices charged by many steelmakers for prompt delivery material. It was through this selling custom that plates rose to 11c and bars to 5c, in some instances. The mill with few contracts thus will be in a better position to furnish prompt material, and the new prices will apply in that case.

Already, within 24 hours of the announcement of prices, inquiry is beginning to reach sales offices. It is believed this will increase in volume and by the end of the week heavy tonnages will by asked by consumers. All contracts must be subject to the decision of the priority committee.

St. Louis Says Prices Are Lower Than Expected

St. Louis, Sept. 25.—Prices on steel, iron and coke announced by Washington yesterday, are lower than looked for by members of the trade here. Opinion varies as to ultimate results, owing to a lack of full details, but it is thought a material reduction in production must inevitably result at the prices fixed upon. Producers with great facilities and low production cost will be able to make money, but endless small plants, the operations of which have been made possible by the recent high prices will not be able to continue operations under the new schedule. A large majority of manufacturers' establishments in this district are covered by contracts extending well into next year for raw materials and their orders for finished goods are based on these contracts so that so far as this general region is concerned the effect will be less noticeable than elsewhere. A leading pig iron manufacturer said that his company could operate profitably on the $33 basis provided there is no further advance in the cost of labor. Consternation seems to exist among coke dealers who say they do not see how it will be possible for the ovens to meet the $6 rate. Officials of the Laclede Gas Co., the largest producers of coke in the regions, say their product has been sold for months ahead at a price considerably under that named by the government.

South Looks for Little Effect This Year

Birmingham, Ala., Sept. 25.—Southern pig iron manufacturers are withholding their views on the new government prices, but the intimation is that cancellations of contracts will be few and that the market for this year will scarcely be affected. The revision of prices which may take place Jan. 1 may bring about change beneficial to the producers. Furnace companies of recent organization, with raw materials purchased at high prices, may suffer from the new condition. Wage increase for workmen promised Oct. 1 will not be interfered with and will be given.

No Change in Iron Prices Now Are Expected

Cincinnati, Sept. 25.—The concensus of opinion in this district regarding the new government fixed prices is that no changes will be made in pig iron quotations at the moment. Furnace representatives claim they have enough iron to keep their plants running through the balance of the year, and on account of uncertainty of coke supply are willing to let the future take care of itself.

East Wonders About High Raw Material Contracts

New York, Sept. 25.—Although the announcement of iron and steel prices by President Wilson yesterday has cleared away the uncertainty as to how the government would regulate the market, the industry finds the situation for the present more indefinite. Instead of settling the matter of prices on iron and steel, yesterday's announcement marks only the beginning of a work of which the details still are to be ironed out. The immediate effect of the announcement has been a temporary cessation of activity in the market.

One of the perplexing problems which the establishment of these prices has brought up, is that where manufacturers of finished products who have bought their raw materials at high prices for delivery over a considerable period ahead. For instance, manufacturers of plates and shapes recently bought basic pig iron for delivery in 1918 at prices in the neighborhood of $50, furnace. If these mills were forced to keep these contracts, they naturally would be at a serious disadvantage as compared with such of their competitors as control their own sources of supply. General opinion among leading iron and steel men is that the new prices would work unwarranted hardship upon such producers, unless some adjustment is made. It therefore is planned by the co-operation of all interests concerned, that a method be worked out by which such adjustments can be effected on as equitable a basis as possible.

In general, the new prices are regarded by leading steelmakers as satisfactory. The new arrangement, it is felt, of necessity will entail hardship in the case of some of the smaller companies who would be unable to compete in normal times. The feeling is that all properly organized companies, with well-equipped plants, will be able to make a favorable showing. The fact that the new prices are subject to revision next January is regarded as entirely reassuring.

That speculating and merchandising in steel products are automatically brough to an end by establishment of new prices, is regarded as conclusive. Much interest, however, is expressed in the status of the jobber who maintains a stock from which he supplies the diversified requirements of countless small consumers, who are not in the habit of dealing direct with the mills. It is considered as likely that some provision will be made for these interests.

Works Forced Down

Due to the shortage of coal for the by-product plant, a large part of the River Steel Works of Corrigan, McKinney & Co., Cleveland, has been forced to temporarily discontinue operations. Commencing Monday, Sept. 24, two batteries of by-product coke ovens, two blast furnaces and six open-hearth furnaces have been forced to bank. Efforts are being made to arrange relief as soon as possible through government officials.

Contracts Not Affected

By Government's Policy—Plate Mills Will Get Steel—U. S. and Allies Want 7,000,000 Tons in Next Two Months

New York, Sept. 26. (By wire.)—Contracts previously placed for ordinary steel raw materials will not be affected by prices announced by President Wilson. It is learned that this point has been thoroughly discussed by producers and the war industries board and a decision was reached that contracts be held inviolable. The belief is that while this policy may cause some financial loss, this will not be as great as might be supposed since much of this material will be used in making finished products contracted for at the old high price.

The question of raw materials for the small plate mills has been discussed and it is believed arrangements will be made whereby large steel producers will furnish steel to such mills as will permit them to operate profitably. This procedure will apply to plates alone since the country will need every ton of this product it can turn out.

The present outlook is that after war steel is supplied there will be little left for other purposes. More than 7,000,000 tons of steel are to be specified by the United States and allies during the next two months alone. A large percentage of these requirements will be for the United States navy. France wants much steel for ship repairs and Italy for various purposes. England wants 500,000 tons of shell steel at least. Therefore, the indications are anybody wanting steel for ordinary purpose will have to take up their requirements at Washington.

Prices on tubular and wire products that have been advanced in the past beyond the Steel Corporation's prices will have to come down since the latter prices are judged to be in about a proper relation with the new steel prices.

Business Experts

Are Asked by Government to Continue Serving on War Committees

Washington, Sept. 25.—The government has appealed, informally, to members of the various advisory and co-operative committees of the war industries board and the council of national defense to continue to give the government their badly needed expert business advice and assistance. What the committeemen will do, in the face of the severe penalties provided in section 3 of the food administration act, is not known. Attorneys for the various committeemen involved, advised them not to jeopardize themselves, and many planned to resign. The steel committee, composed of the American Iron and Steel institute committee, has been appealed to to resume its functions which were suspended when the law was passed.

Scrap Prices

Are Nominal as Market Waits Action by Government

Pittsburgh, Sept. 25.—Scrap dealers are anxiously waiting for the government to name prices for old material. No one has a clearly defined idea as to what figures may be named. Considerable interest is aroused as to what prices will be fixed for the leading grades, such as heavy melting steel now quoted at $36 to $38. In view of the fact that the price of basic pig iron was reduced to $33, or $9 below the figure at which 2000 tons of this grade were sold last week, there is speculation as to whether a similar cut will be made in heavy melting scrap with corresponding differentials applied to other grades. Only one transaction of importance was reported during the week, the Carnegie Steel Co. taking 25,000 tons of heavy melting steel from a dealer in this district at $37.50, for delivery at the Donora and Munhall plants.

Sell at New Price

Pittsburgh, Sept. 26. (By wire.)—Old lots of foundry iron aggregating a good-sized tonnage have been sold at $33, furnace, the price made by the government. Negotiations also are reported to be under way for sizable tonnages of basic iron.

Three Allis-Chalmers motor-driven pumping units will be installed at the blast furnace plant of the Federal Furnace Co., South Chicago. They have a capacity of 5,000,000 gallons per 24 hours, and bring the total capacity for the plant to 30,000,000 gallons per 24 hours.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, Sept. 25.—The copper trade for months awaited the fixing of a copper price by the government. Last Thursday night it was announced that a price had been fixed, 23.50c, to the government, the allies and to the public. The price was fixed under voluntary agreement between copper producers and the war industries board. The copper trade is in doubt as to many details. Until further information is forthcoming, the trade—producers, middlemen and consumers alike—will be at sea. Sellers have not revised their selling schedules, awaiting further instructions and consumers naturally are not willing to pay more than 23.50c. Some spot electrolytic is being offered around 26.50c, cash, New York. Among the questions which the trade is trying to answer are the following: How will the price decision affect existing contracts, especially between producers and middlemen? Will dealers who have shipments of copper coming to them the last quarter at prices of 26c and higher be allowed to resell this copper at a profit? What measures will be taken to prevent consumers who may buy at 23.50c from reselling at a profit to those who are unable to obtain copper? What arrangements will be made to take care of the small consuming trade which depends upon the jobbers, as the jobbers will be unable both to sell and buy at 23.50c and remain in business? Does the decision include lake and casting copper as well as electrolytic, which alone was mentioned in the statement? Will the government undertake to fix the conversion charge on copper and brass products?

The dullness which has prevailed in copper has extended also to the other metals, except that lead has been more active since last Friday. The sharp cuts in lead from 11c to 8c by the American Smelting & Refining Co. have been met by outside sellers, but there has been little shading of the existing quotation of the leading interest. The present market is 8c, New York, and 7.92½c, St. Louis, for all positions in which business may be done.

Although demand for spelter has been extremely light, sellers have retained their recent firmer views and it is difficult to obtain prime western at less than 8.25c for nearby delivery or 8.37½c for the last three months of the year. Little business is reported in brass special or high grade, these being quoted 8.75c to 9c and 13.50c, St. Louis, respectively.

A rumor has circulated in the tin market that no more permits would be granted on October shipments of tin direct from the Straits, this report being advanced as the cause for the recent sharp advance in the London market. Inquiry for tin has been fair, but sellers have been rather hesitant. Spot Straits tin is quoted about 62c; Banca, 60.25c; No. 1 Chinese or Lamb & Flagg, 56.50c.

The antimony market is extremely quiet. The general quotation for Chinese and Japanese brands for spot and October delivery is 15c to 15.25c, duty paid.

The aluminum market continues weak and irregular, with No. 1 virgin quoted 42c to 45c; No. 1 remelted, 40c to 43c; and No. 12 remelted, 33c to 37c, in the outside market.

How to Season Gray Iron Castings

Various Methods of Seasoning Castings Adopted by Individual Manufacturers Have Produced a Variety of Results and Proffered Many Questions Which Still Are Unsatisfactorily Answered

BY L. M. SHERWIN

THE term seasoning is a very broad one and numerous definitions can be found covering various methods of procedure, but the one which has the most bearing on this subject is as Webster gives it, namely, "the maturing or the changing from the crude to the more perfect condition; to mature; to grow fit for use." This is what actually happens to gray iron castings when they are subjected to any process tending towards their improvement. The necessity for seasoning is due largely to internal strains and existing stresses arising usually from the design of the casting, or from some unusual condition such as heat and cold being applied to any one particular location on a casting and not to the other sections. There are several different methods of seasoning castings in vogue at the present time, and it would be difficult indeed to determine without actual experimenting with the various processes just which method would be the more valuable and which one could be recommended the most highly. Individual requirements would be the governing factor in determining the method, and would, therefore, prevent making a general or definite assertion. Some of the methods being used are as follows:

1.—Casting remaining in one place and position for an indefinite period, and in some cases exposing them to weather conditions, before they are finish-machined.

2.—Castings having been rough-turned or planed, and then subjected to a heat of several hundred degrees, say as high as 400 degrees Fahr., for a definite period of time.

3.—Castings heated from 150 to 300 degrees Fahr. before having the scale removed.

4.—Castings heated and reheated several times at 400 degrees Fahr.

It is generally recognized that there is some benefit to be derived from some sort of seasoning. It has been found that the castings after receiving this treatment will have a greater tendency toward holding their shape more permanently than those that have not received any treatment, and as far as is known at the present time about straightedges, surface plates and other castings of a similar nature; the second method is preferable and can be recommended.

Much has been written about shrinkage, internal strains, external stresses and contraction, and all of these factors have a decided relation to the seasoning process. The shrinkage, both internally and externally, usually is the result of poor designing, but there are many instances where the mixture of the gray iron is entirely at fault, causing these unusual conditions. With a casting so designed that there are several, or even one heavy and one light section, the heaviest portion will naturally be the last to become solid, which indicates that the lighter section on cooling drew the molten metal to that part and in so doing left void places in the heavy sections. The reductions in the various dimensions of a casting, after reaching the solidified state, is known as the contraction. Sometimes the internal shrink is referred to as the *spongy shrink*, and the external shrink as the *sucking in shrink*. The former in many cases is caused by the carbon in the mixture being too high, while the latter is due to too low carbon in the mixture. The above conditions will effect the strains and stresses, and, as these are the governing factors regarding seasoning, every known precaution that is practicable should be observed in order that castings to be seasoned will be sound and be of good texture, regardless of the method which is to be used later in

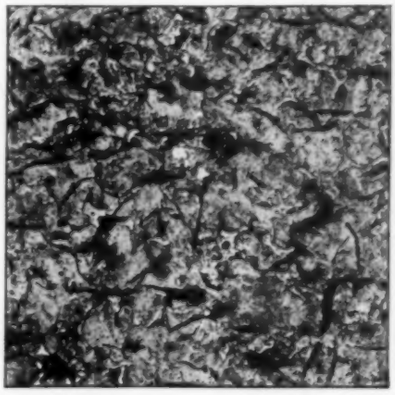


FIG. 1—MICROGRAPH OF TEST BAR *1A*
Heated at 1100 Degrees Fahr. for 24 Hours—Microstructure Unchanged—Magnified 100 Times

FIG. 2—TEST BAR *1A*
Magnified 500 Times

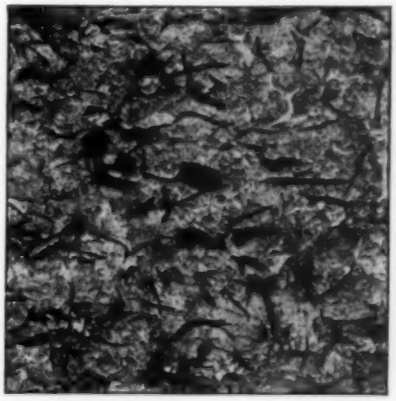


FIG. 3—MICROGRAPH OF TEST BAR *2A*
Microstructure as Cast—Magnified 100 Times

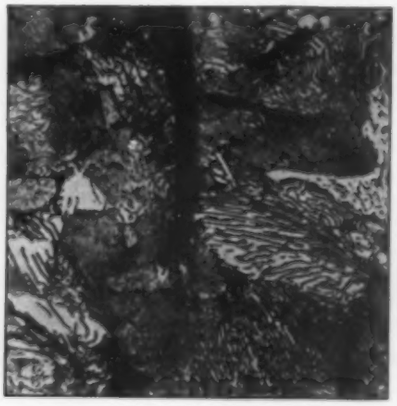


FIG. 4—TEST BAR *2A*
Magnified 500 Times

A paper presented at the Boston meeting of the American Foundrymen's association. The author, L. M. Sherwin, is associated with the Brown & Sharpe Mfg. Co., Providence, R. I.

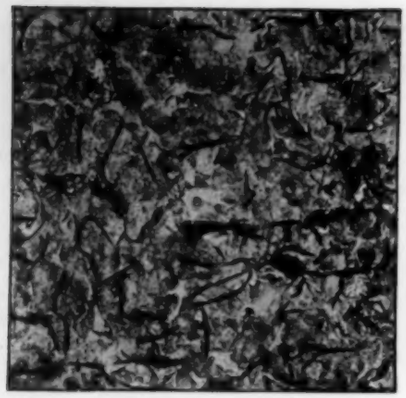


FIG. 5—MICROGRAPH OF TEST BAR *3A*
Microstructure as Cast—Magnified 100 Times

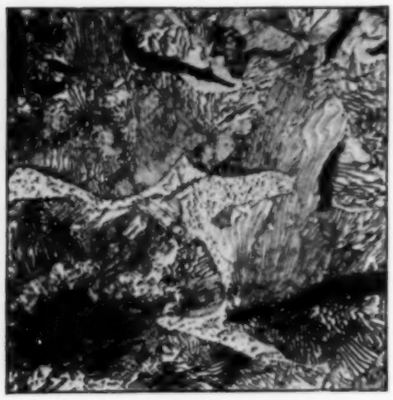


FIG. 6—TEST BAR *3A*
Magnified 500 Times

seasoning. The casting undergoes expansion and contraction during the process of cooling from the molten state to the solidified condition and after reaching this state the mobility of the molecules will allow for seasoning.

Many interesting experiences and facts have been brought out during the past few years in connection with seasoning and several experiments carried through which have proved more or less successful. At the present time tests and experiments are being conducted with surface plates and straightedges to determine the best and most economical method of handling gray iron castings for these purposes.

Several years ago an elaborate system, consisting of a large box containing coils of steam pipes, was installed. The castings were placed in the box and live steam passed over the castings through the pipes; thus raising the temperature in the box to the desired degree. This system was discarded as being too expensive for the results obtained. The value of this method has always been a debatable question.

Various efforts have been made to equalize the strains and stresses. Some of these have been the designing of a surface plate with two parallel faces and a uniform distribution of metal throughout. This particular casting has been in daily use for several years and seems to be giving entire satisfaction. The casting was first rough-planed and then heated. Also there have been castings such as sliding tables designed with several medium and light sections, as well as other castings with all the sections of relatively the same proportions and weight. Experience has proved the uniformly designed table to be less changeable. It is probable that by heating the former castings to some definite degree for several hours their tendency to warp would be materially lessened.

Instances where manufacturers have claimed that a certain straightedge had changed its shape during the day have been investigated, and it was found that the room temperatures were affecting the marking (the marking is shown by rubbing the prepared surface against a master plate). The temperature of the room in such cases was about 60 degrees Fahr. Upon raising the temperature to 70 degrees the trouble was entirely eliminated.

It has also been found that the temperature will materially affect the marking of all surface plates and straightedges, and the most satisfactory temperature for working conditions at which the marking and scraping is done is about 70 degrees Fahr. It is almost impossible at the present time, unless under ideal conditions regarding room temperatures, to scrape and mark these castings in one continuous period. Some castings are started and worked on for one-half hour between the hours of 7:00 a. m. and 7:30 a. m., then they are laid aside for two hours and at 9:30 a. m. the scraping is again started and finished. The change under these conditions is no greater than 0.001 inch in a length of 6 feet. In the winter the changes referred to are more perceptible than in the summer, and the long narrow castings show a more noticeable change between the temperature of 60 degrees Fahr and 70 degrees Fahr. than from 70 degrees Fahr. to 80 degrees Fahr. A difference of 10 degrees makes a change in the marking of approximately 0.001 inch. If a straightedge is marked and scraped at 70 degrees Fahr., then marked again at 85 degrees Fahr., it is very seldom that any change can be detected. If,

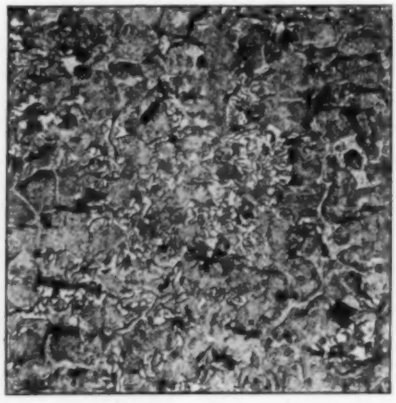


FIG. 7—MICROGRAPH OF TEST BAR *4A*
Microstructure as Cast—Magnified 100 Times

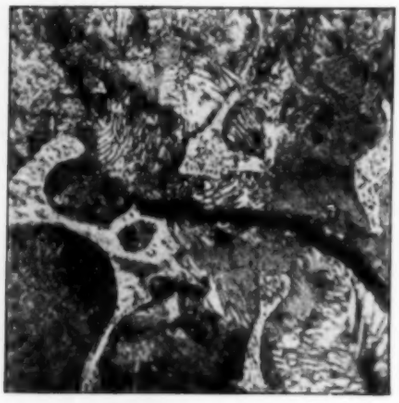


FIG. 8—TEST BAR *4A*
Magnified 500 Times

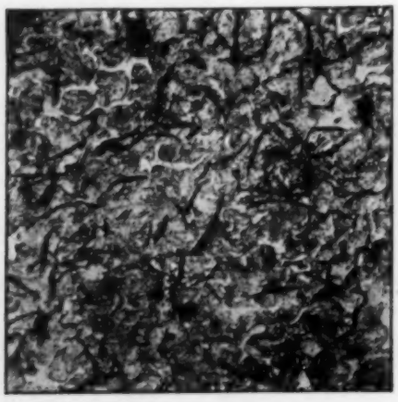


FIG. 9—MICROGRAPH OF TEST BAR *1A'*
Microstructure as Cast—Magnified 100 Times

FIG. 10—TEST BAR *1A'*
Magnified 500 Times

on the other hand, the castings are marked and scraped at 70 degrees Fahr., to say 60 degrees Fahr., a noticeable change takes place. Of course, where there are heavy and light sections and corresponding strains and stresses, the light sections are more easily affected by the rise and fall of the temperature.

The placing of the bare hand on the center of a straightedge 4 feet long in less than half a minute changes the marking. Consequently, all surface plates and straightedges are fitted with wooden handles to be used by the workman to prevent this change from heat. The sunlight coming through a window and striking such castings quickly change them.

When working on straightedges, one man has three straightedges, and, if on surface plates, he has two. The trouble is usually encountered in the machining and scraping, and it is a very expensive proposition to refinish these castings after they have been once

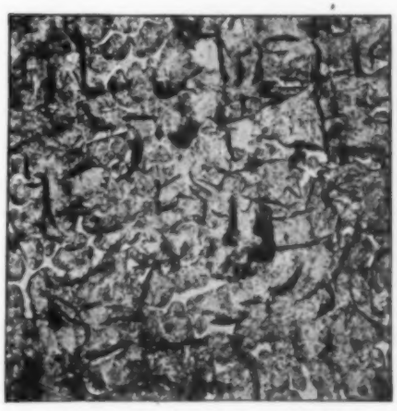


FIG. 11—MICROGRAPH OF TEST BAR *2A'*
Heated at 1100 Degrees Fahr. for a Period of 1 Hour, Three Different Times—Microstructure Unchanged—Magnified 100 Times

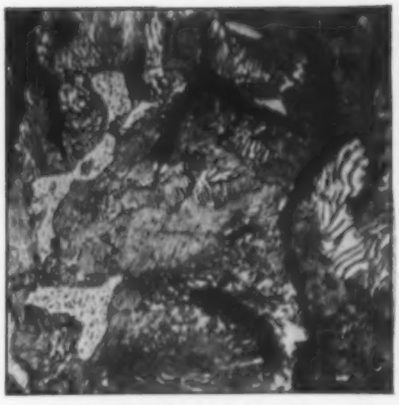


FIG. 12—TEST BAR *2A'*
Heated at 1800 Degrees Fahr. for 24 Hours, Pearlite Completely Decomposed—Microstructure Unchanged—Magnified 500 Times

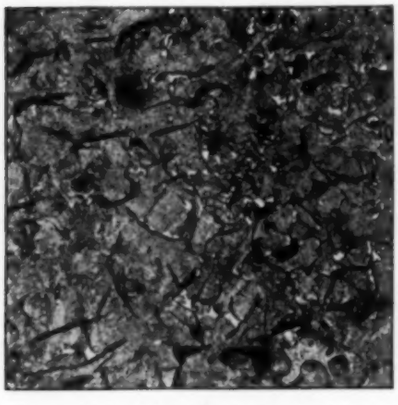


FIG. 13—MICROGRAPH OF TEST BAR *3A'*
Heated at 400 Degrees Fahr. for 16 Hours, Microstructure Unchanged—Magnified 100 Times

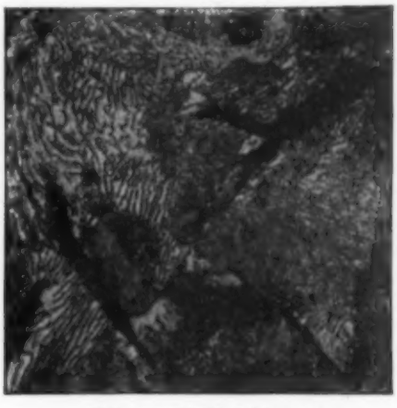


FIG. 14—TEST BAR *3A'*
Magnified 500 Times

finished. Therefore, every precaution is taken to make the casting as nearly correct as possible. The best results can be obtained by seasoning.

Every surface plate and straightedge is first rough-planed and then subjected to a temperature varying from 350 to 550 degrees Fahr., depending entirely on the size, shape and class of the castings. Some castings require 350 degrees, others 400 degrees Fahr., while still others may require 500 degrees Fahr. After heat treating, the castings are finish-machined and then scraped.

It is wrong to assume that after a casting has been seasoned that it will be immune from any changes. Excessive heat and cold will always affect the castings, but after the cause has been removed the castings return to their original shape unless the heat or cold has been so intense that the castings have become warped. In such an event, re-machining is necessary.

Long narrow plates give far more trouble in machining and scraping than square castings. Very little difficulty is experienced with narrow castings of short lengths. On the other hand,nearly all castings which have not been heat treated and are left for a long period of time in the yard exposed to the weather, are found to be seasoned to an extent about equal to that which the castings receive from heat treatment.

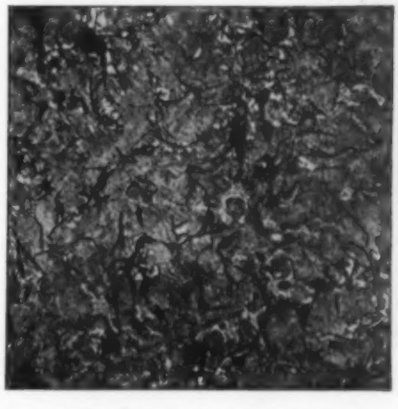


FIG. 15—MICROGRAPH OF TEST BAR *4A'*
Microstructure as Cast—Magnified 100 Times

FIG. 16—TEST BAR *4A'*
Magnified 500 Times

If unlimited time could be given to castings which need fine finishing and scraping, they could undoubtedly be seasoned as well without heat as with it, but the condition of manufacturing at the present time would make this plan prohibitive.

It has been reasoned that if heating to from 300 to 500 degrees Fahr. proves beneficial, why would not a higher temperature be more effective? On the assumption that this theory is correct, we have at the present time various castings undergoing this treatment. The castings have been carried through the various processes up to scraping and marking, and it is to be regretted that more time was not available for the completion of these experiments. To date the results have been fairly satisfactory, but they have not reached the stage where they could be tabulated with any degree of certainty as to their correctness. The relative merits of the plates heated to 400 and 1100 degrees Fahr. are about equal. Before proceeding with these experiments it was absolutely necessary to determine what temperature would be a safe maximum to adopt for the treatment of the

Data on Tests of Seasoned Castings

	1A	1A'	2A	2A'	3A	3A'	4A	4A'
Silicon	1.86	1.87	1.75	1.83	1.91	1.93	1.95	1.97
Sulphur	0.116	0.115	0.118	0.119	0.080	0.075	0.081	0.078
Manganese	0.56	0.52	0.54	0.51	0.51	0.53	0.51	0.53
Phosphorus	0.49	0.42	0.44	0.41	0.49	0.45	0.48	0.47
Combined carbon	0.73	0.69	0.71	0.65	0.79	0.67	0.68	0.64
Graphitic carbon	2.47	2.47	2.47	2.51	2.57	2.61	2.77	2.75

Tensile Tests

Bar	Pounds per square inch
1A	37,200
2A	37,000
3A	36,300
4A	34,300
1A'	36,900
2A'	35,100
3A'	36,000
4A'	35,400

Scleroscope Test

Bar	Number
1A	36
2A	34
3A	33
4A	36
1A'	35
2A'	35
3A'	33
4A'	37

Brinell Tests

Bar	Number
1A	207
2A	207
3A	187
4A	183
1A'	192
2A'	196
3A'	187
4A'	196

castings when considering the wearing qualities, shape, etc. The transformation range for cast iron of this grade is between 1250 and 1375 degrees Fahr. This means that when heated above the latter temperature the combined carbon, structurally termed pearlite, is changed slowly into its elements, namely, iron and carbon. Later at a higher temperature the graphite increases the size of the previously formed graphite.

Carefully conducted experiments with this iron to obtain heating and cooling curves resulted in establishing the arresting point on cooling at 1330 degrees Fahr. A long period of heating at a temperature below this range, namely, 1100 degrees Fahr., should not affect the microstructure of any component. To verify these premises was one of the objects of the heat treating experiments.

Twenty castings were used in these experiments and were cast at approximately the same time in the heat and under the same conditions, such as rapidity of pouring and temperature of the metal. The castings were all removed from the sand at about the same time and were given an equal chance for cooling. All were rough-planed and some of them subjected to various heats, while others did not undergo the heat treatment.

The castings used in the experiments were four straightedges, 1⅞ x 36 inches; six straightedges, 2 x 48 inches; four surface plates, 24 x 48 inches; and six surface plates, 6 x 26 inches. A set of two test bars were cast with the same mixture and at the same time as were each of the four 24 x 48-inch surface plates, and marked 1*A*, 1*A'*, 2*A*, 2*A'*, 3*A*, 3*A'*, 4*A*, and 4*A'*. The bars 1*A*, 2*A*, 3*A* and 4*A* were tested as cast. Bars 1*A'*, 2*A'* and 3*A'* were tested after being heated as follows:

1*A'* heated to 400 degrees Fahr. for a duration of 24 hours.
2*A'* heated to 1100 degrees Fahr. for a duration of 24 hours.
3*A'* heated to 1100 degrees Fahr. on three different occasions and cooled in each case.

The bar 4*A'* was tested as cast. In each case the bars *A* and *A'* were cast at the same time and in the same mold.

Another test bar, *B*, cast of the same quality iron, was then heated to 1800 degrees Fahr., but the micrograph proves the method to be undesirable.

It was desired to ascertain, if possible, the differences in the chemical composition and physical condition between the bars as they were cast and after being heated to various temperatures. The four 1⅞ x 36-inch straightedges were treated as follows:

1.—Heated to 400 degrees Fahr. for a duration of 24 hours.
2.—Heated to 400 degrees Fahr. for a duration of 72 hours.
3.—Heated to 400 degrees Fahr. for a duration of 168 hours.
4.—No heat.

The 2 x 48-inch straightedges were treated as follows:

1.—Heated to 350 degrees Fahr. for a duration of 24 hours.
2.—Heated to 350 degrees Fahr. for a duration of 48 hours.
3.—Heated to 350 degrees Fahr. for a duration of 72 hours.
4.—Heated to 1100 degrees Fahr. for a duration of 24 hours.
5.—Heated to 1100 degrees Fahr. three different times and cooled in each case.
6.—No heat.

The 6 x 26-inch surface plates were treated as follows:

1.—Heated to 400 degrees Fahr. for a duration of 24 hours.
2.—Heated to 1100 degrees Fahr. for a duration of 24 hours.
3.—Heated to 1100 degrees Fahr. on three different occasions and cooled in each case.
4.—Heated and reheated several times at 400 degrees Fahr.
5.—Placed in yard for an indefinite length of time.
6.—No heat.

The 24 x 48-inch surface plates were treated as follows:

1.—Heated to 400 degrees Fahr. for a duration of 24 hours.
2.—Heated to 1100 degrees Fahr. for a duration of 24 hours.
3.—Heated to 1100 degrees Fahr. on three different occasions and cooled in each case.
4.—No heat.

The chemical analyses of the test bars and the results of physical tests are shown in the accompanying table.

The following questions have been asked and up to the present time the writer feels that the answers are still a matter of personal opinion and still remain in doubt. Therefore the questions cannot be answered fully and correctly. The questions are:

1.—What are the actual relations of seasoning to internal and external stresses and strains?

2.—Will the chemical composition have a direct bearing on results for castings to be seasoned?

3.—What is the quickest and most accurate way of determining whether the castings are stressed; and, if such is the case, what is the most effective way of realizing the value of these stresses?

4.—What is the best method of seasoning to determine which process would be of the greatest value and at the same time the most economical?

To arrive at any definite conclusions regarding the above questions it will be necessary to experiment to a much greater extent than has been done up to the present time. It is to be hoped that such experiments, which are based on sufficient data to be worthy of attention, will be published. Failures as well as successes should be recorded, as each failure will then help toward ultimate success.

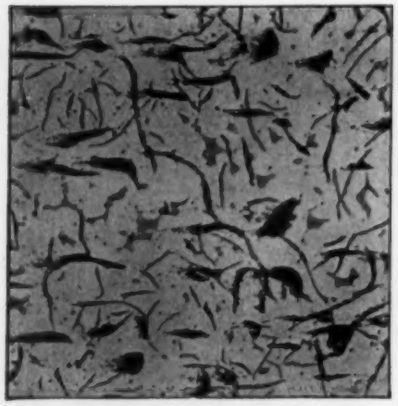


FIG. 17—MICROGRAPH OF TEST BAR *B*
Heated at 1800 Degrees Fahr. for 24 Hours—Pearlite Completely Decomposed—Graphite Flakes Larger—Phosphide Structure Altered—Magnified 100 Times

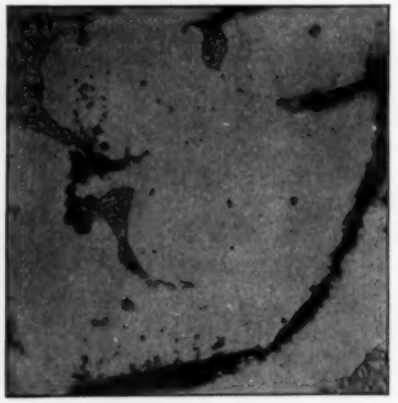


FIG. 18—TEST BAR *B*
Magnified 500 Times

Casting Shells in Permanent Molds

A Complete Exposition of the Cast-Iron Shell Problem—The Author Shows How Iron Shells Are Superior to Forged Steel in Many Respects —Complete Fragmentation Obtained

BY EDGAR ALLEN CUSTER

THE present conflict has brought about wonderful changes in the generally accepted ideas of warfare. The terrible curtain of fire has made its appearance, earthworks and trenches have been substituted for elaborate and costly fortifications and the airplane and submarine have profoundly influenced the strategy on land and sea. In the trenches, old-time stink pots and grenades are being thrown by the ancient catapult, bombs are shot from a contrivance that closely resembles a homemade Fourth-of-July cannon and the form of a slingshot that David used on Goliath, has been modernized to a wonderfully effective point. Now we have the spectacle of an unheard of number of rapid-fire, high-caliber guns raining upon the enemy, myriads of cast-iron shells. The continued use of these apparently grotesque contrivances and the revival of cast-iron shells rests on the fact that they have been found to be the most effective means for doing the work in hand.

There is nothing new in the use of cast-iron projectiles—before the age of steel they were the sole means of battering down defenses and attacking at long range. Some of the reasons why the use of cast-iron shells was abandoned are that the metal has never had a very good reputation for uniformity and freedom from sponginess and gas holes; its tensile strength is low and it lacks toughness. Any of the defects commonly found in cast iron will seriously affect the trajectory and direction of a shell and render it comparatively useless. It must be absolutely reliable and land at the point at which it was aimed. If one portion is spongy and hence lighter, it will wobble in flight and its main purpose will be destroyed. The weakening effect of sponginess or blowholes may cause the shell to break under the shock of the initial explosion and destroy the gun. A forged steel projectile meets all these objections and has the call.

The objection to steel projectiles is that they are comparatively ineffective against earthworks or trenches when the caliber is 5 inches or less. The amount of contained explosive is small and a great proportion of the explosive effect is used in bursting the walls of the shell. In larger sizes this objection is less apparent. The explosive effect increases with the added charge in a greater ratio than the strength of the added amount of metal in the projectile. The present war has taught us that steel, concrete and brickwork offer but little resistance to modern siege guns and they have been abandoned for earthworks manned with an ample force. The burden of attacking must and does rest with the artillery and the army that is equipped with the most effective guns using the most effective projectiles, will win the most battles. The projectile that is most efficient against earthworks and covers its zone of dispersion with the greatest number of fragments of the proper size is the projectile that will surely be used. It only remains to make that projectile so that it not only will be strong enough to resist the propelling explosion, but also will be perfectly sound and uniform in texture.

Target Shells Do the Work

During the Spanish-American war, when our fleet was off Santiago, it was observed that one vessel was creating great havoc in the earthworks guarding the entrance, and upon investigation, it was found that this vessel was using loaded practice shells. These shells would tear great holes in the works, while the steel shells were comparatively ineffective. As the vessel had quite a number of these shells in stock, it became very popular with the other ships. A few years ago, some experiments were made on the lower Chesapeake to determine the effect of cast-iron shells on the superstructure of a condemned war vessel. One shell that penetrated the structure and burst in a ward-room was particularly observed. The room was about 20x60 feet and one side was lined with lockers. Every locker was torn to pieces and the paint on the walls and ceiling in the line of the explosive force was cut off as with a sand blast. It was the unanimous opinion that the explosion would have killed every man who happened to be in the room at that time. A few tentative experiments were made after this and a permanent mold was constructed, but the project was allowed to drop and no effort was made to thoroughly investigate the subject.

The first intimation we had that cast-iron shells were being used in the present war, was an article in the *London Engineer*, which described a number of fragments of cast iron that were undoubtedly portions of an exploded shell. It was noted that some of the pieces were slightly chilled on one side and the *Engineer* surmised that cast-iron cores were being used. As the peculiarly destructive effect of these shells was observed not only in the open, but also against earthworks, the idea that the Germans were using cast-iron shells on account of the scarcity of steel was abandoned. As a matter of fact, as early as May, 1913, German and Italian munition makers were discussing this phase of projectile work and were seeking all the information that was available. In August, 1913, it was reported to the writer that shells had been made that were satisfactory in that they had the proper degree of fragmentation and were strong enough to resist the effect of the propelling charge. Moreover, these shells were made in iron molds with iron cores.

The theory of the cast-iron shell is that, when used against earthworks, the greater part of the explosive force is not expended in bursting the walls of the shell and the effect is as if that amount of explosive were detonated in the earthwork. When used in the open, the great fragmentation of cast iron will allow the shell to burst into a far greater number of pieces than a steel shell and will cover the zone of dispersion very closely. It is essential for the work that the degrees of fragmentation be calculated to a nicety. Too great fragmentation will make the shell ineffective. A steel shell weighing 13½ pounds, when charged with one pound of TNT, will burst into approximately 1050 pieces if there is complete detonation. The largest pieces average 0.3 to 0.4 pound in weight and many of these are splinters due to the fibrous nature of the metal. The

A paper presented at the twenty-second annual meeting of the American Foundrymen's association at Boston, Sept. 25-28, 1917. The author, Edgar Allen Custer, Philadelphia, is an engineer who has specialized on making castings in permanent molds for over a decade.

fragments recoverable have a wide variation in weight, as shown by the fact that while the average weight of the large fragments is almost half a pound, the average weight of all the fragments is about 0.01 pound. It follows that a very large per cent of the fragments would do no harm or at least would not disable except at very close quarters. A cast-iron shell under the same conditions would burst into nearly 1500 pieces with the fragments comparatively uniform in size and weight. It has been found that wide differences in the fragmentation of steel shells have been caused sometimes by the incomplete detonation due to the primer failing to function properly. This is not so serious with the weaker cast iron, but serves to emphasize the fact that a large proportion of the explosive force is expended in bursting the steel walls.

Target shells have been made of cast iron for many years and almost

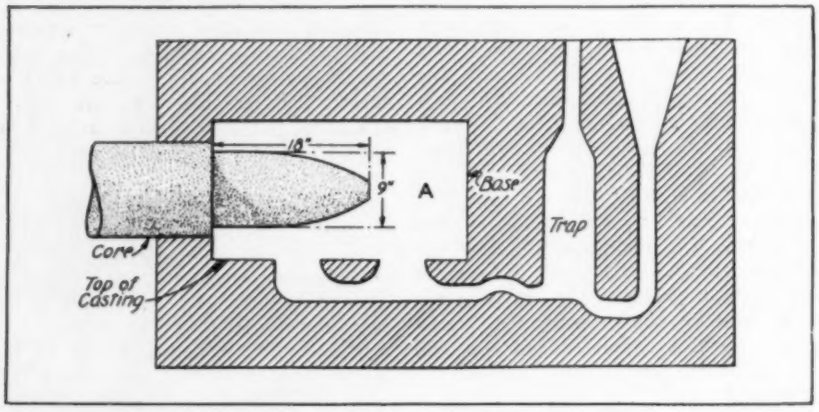


FIG. 1—TWO-PART CAST-IRON MOLD OF SHELL BUSHING WITH 15 INCHES OF METAL SURROUNDING GATES, RUNNERS AND CASTING

any foundry can make them. It is only essential that the casting be solid and capable of being machined to the proper sizes. The weight of the bursting charge is made up by thickening the walls. If it is not up to weight, a little sand is poured into the cavity. When it comes to making a projectile of cast iron that is to be used against an enemy, a number of difficulties are set up. It must be very strong, it must be easily machined, it must be absolutely solid and free from spongy spots and blowholes, and above all, every shell must have exactly the same degree of toughness. To meet these requirements, the foundry must be run on a strictly scientific basis. There can be no guess work or slipshod methods. When shells are cast in sand, the elements of carbon, silicon and manganese must be held to very definite limits, and these limits vary with the thickness of the shell walls. Moreover, these limits can only be determined by trial. The point aimed at is the correct degree of fragmentation and all foundry methods must be carried out with this point in view. Dry-sand molds, open and porous; perfect cores and trap or swirling gates must be used. The foundry requirements for this work have been ably set forth in an article by Edgar A. Custer Jr., in the April, 1917, issue of *The Foundry* and the methods of melting and care of iron and fuel described must be carried out whether the shells are made in sand or in a permanent mold.

Ordinary foundry iron when properly cast in a permanent mold and when removed at the proper time, has in the resultant casting, the same degree of hardness irrespective of any variation in the chemical constituents, so long as the same size, weight and shape of casting is made. The time the casting remains in the mold is the determining factor of the degree of hardness. A casting weighing about 60 pounds remains in the mold 4 or 5 seconds, while a casting of the same general contour weighing 500 pounds will require from 25 to 60 seconds before it is safe to lift it out. To illustrate this point, data on a casting weighing 1100 pounds are presented. Fig. 1 shows the general outline of a mold that was used to make a shell bushing. It will be seen that a trap gate was used and that the casting had a very heavy base and comparatively thin upper walls. In fact, about 65 per cent of the total weight was concentrated in the lower third of the casting. This large mass of metal increased the time interval in that it was necessary to set the walls deeper than in a casting of smaller bulk. There were no risers and the only means provided for the escape of air from the matrix were a few shallow channels cut into the mold at the top of the casting. A large cast-iron core operated by a hydraulic cylinder formed the interior cavity. The mold was opened and closed by a similar cylinder. Into this mold irons of the following analyses, all of which were melted in an ordinary cupola, were poured:

	Mixture			
	No. 1	No. 2	No. 3	No. 4
	Per cent	Per cent	Per cent	Per cent
Manganese	1.50	0.50	0.80	1.50
Sulphur	0.03	0.05	0.06	0.03
Silicon	1.05	1.75	2.25	1.05
Phosphorus	0.05	0.06	0.06	0.05
Steel scrap.....	....	....	....	16.00

From 10 to 12 castings were poured from each of these irons and when the castings were broken, not one showed the least sign of sponginess or gas holes. The mold was poured full and the first part to freeze was the entrance gate so that there was no possibility of feeding. Only enough iron was poured to fill the cavity.

The time of setting was measured by the time the core remained in the casting before it was safe to draw it. No. 1 iron required 1 minute and 20 seconds before the core was drawn. When the core was allowed to remain in the casting 1 minute and 30 seconds, it was gripped by the iron and had to be cooled to room temperature before removal was possible. No. 2 iron required 1 minute, and No. 3, 30 seconds. In No. 4 a new condition was set up when 16 per cent of scrap steel was melted with the charge in the cupola. In this case it was 2 minutes and 20 second before the core could be withdrawn. The results show that in a casting of this size, the low silicon iron cools much slower than one of higher silicon content. The effect of the long time in the mold was to make the casting very hard and heat treatment was given to bring it to machinability. The temperature of the core had no effect on the time of setting, the tenth casting was given the same time as the first, although the core was heated to a temperature of over 400 degrees Fahr.

A mold was made for a shell that, when finished, weighed 60 pounds. The mold was made in three parts, as shown in Fig. 2, and was equipped with a cast-iron core. It will be seen that the portion of the shell forward of the bourlette band is cast in the solid part of the mold and no provision is made for venting. The parting of the movable portions of the mold runs in a straight line through the center of the shell and extends 3 inches beyond the base. It then turns at an angle of 45 degrees and runs straight the remaining distance to the outside of the mold. The pouring cup is placed about 5 inches from the outer end of the parting and

the main sprue runs down to an easy curve to the bottom of the trap. The entrance to the trap is ¾ inch in diameter, while the main sprue is 1½ inches in diameter. The trap gate is 5x4 inches with heavy filleted corners and open at the top. The sides are given ⅛-inch draft, so that the moving parts of the mold will open readily. The bottom of the trap is set low enough to allow a slight hump to be placed in the runner between the trap and the matrix. This hump serves to catch any air or dirt that may be carried with the first rush of the metal. The center line of the runner is 3 inches below the bottom of the matrix and two gates are cut—one between the revolving band and the base and the other between the band and the bourlette. The gates are 1/16 inch wide and have a small fillet where they enter the matrix. The mechanism for drawing the core is attached to the part *A* and moves with it. Channels are cut in *A* and *B* in the proper position to receive the copper band. The operation of casting is as follows: The copper band is placed in the channels, the mold closed and then poured as fast as the runner will take the metal, keeping the pouring cup full until the end. In four seconds the core is withdrawn, the mold opened and the casting removed. The copper band will be firmly cast into place.

Analysis of Mixture

It was found that a mixture corresponding to No. 4 in the experiment previously mentioned, with the exception that the manganese was under 0.08 per cent, gave the casting the toughness necessary for the proper degree of fragmentation, but the long exposure in the mold made the casting too hard. A scleroscope-reading of 65 to 70 was the invariable result irrespective of any difference in the mixtures. It was evident that some form of heat treatment was necessary to bring the casting to a workable condition. It had been determined that a mark of 45 would give the proper degree of fragmentation. Quite a number of trials were made before it was found that a "flash" heat of 865 degrees Cent. would restore the casting to a good workable condition and bring the scleroscope to just about the correct figure. It was further found that the castings should be allowed to cool before being subjected to the treatment so that a number of shells could be treated at the same time, starting at the same basis of temperature. If the heating furnace has sufficient heat capacity, it requires about 20 minutes to bring the castings to the right temperature and they are then allowed to cool free from drafts.

In a permanent mold, it is impossible to get a casting free from gas or air holes without the use of trap gates. There is no trouble in filling the mold when semisteel is used. The metal does not need to be poured especially fast. Nevertheless, unless a substantial trap gate is provided, small holes will collect against the bottom of the core and the top of the casting. The most careful pouring will not change this condition. There is a point when semisteel can be poured in a permanent mold without these holes forming and without trap gates, and that point is when the metal has cooled until it is almost

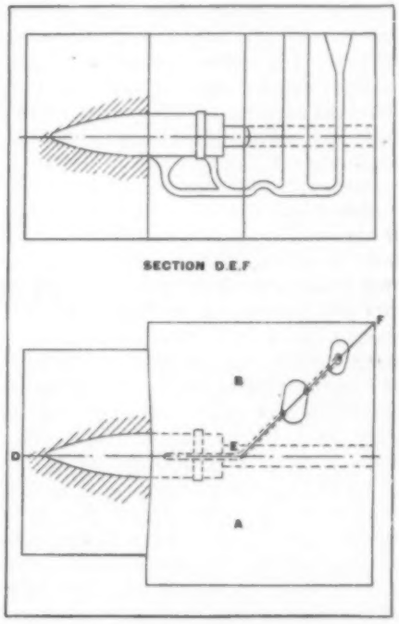


FIG. 2—SKETCH OF THREE-PART PERMANENT MOLD FOR A 60-POUND SHELL

viscid. The difficulty of successfully hitting this point is so great as to make this method beyond the range of commercial success.

The difficulties that lie in the way of making a cast-iron projectile in sand have been set forth. Some of these troubles may be avoided by the use of a permanent mold. The selection of different irons for different sizes of shells is not necessary. To explain this, one must take into account the fact that the influence of silicon and manganese is exerted only when the molten metal is cooling in the mold and the total effect of this influence is measured by the time the molten metal takes to become solid.

In a sand cast projectile weighing 65 pounds, the time is 5 minutes, in a permanent mold casting the time is 5 seconds. The softening effect of silicon is due to its property of forming graphitic carbon—in itself silicon is a hardener. A casting with no carbon and high in silicon would be hard as glass. It requires a certain amount of time to form the graphite flakes and if this time is reduced to a minimum, the formation of these flakes will be prevented. Graphitic carbon will be present, but it will be in such a finely divided state as to be practically amorphous. It resembles the temper carbon of a malleable casting, but is uniformly distributed throughout the structure. Now if the time of setting is so short as to prevent the formation of graphitic flakes, it must follow that under these conditions, silicon has no softening effect. The same statement may be said as to the effect of manganese. A moderate amount of manganese will add strength to a sand casting and is a valuable constituent for a great variety of work. In a permanent mold casting the effect is to make the casting hard and brittle.

Importance of Fragmentation

When cast iron shells are used in the open, the fragmentation must be exact, but when used against earthworks, only the explosive force counts. Since it is impossible to set aside shells for each duty, it is obvious that the degree of fragmentation must govern the process. This is easier to accomplish with a permanent mold than by any other known process. As has been said, the question of hardness does not depend upon the variations of the pig iron so long as ordinary foundry iron is used. The same statement is true of the so-called semisteel so long as the same percentage of steel scrap is melted with the iron. The term "ordinary foundry iron" is used to denote pig iron ranging from 1.75 to 2.75 per cent silicon, below 0.80 per cent manganese and with sulphur below 0.08 per cent. Phosphorus has no appreciable effect up to 1.00 per cent. A casting that would analyze 3.00 per cent total carbon, 1.00 to 1.20 per cent silicon, 0.06 per cent manganese, 0.05 per cent sulphur and 16 per cent steel scrap would be an ideal composition for a 60-pound shell. All shells whether cast iron or steel, must be subjected to a definite heat treatment and, in the case of cast iron, the degree of heat and time of exposure to get the proper scleroscope test, can be determined only by experiment.

Now a word about the design of the mold. The main point to be considered is that plenty of metal should surround not only the matrix, but also the sprues and runners. In a casting such as a 5-inch shell, there should be at least 10 inches of metal outside of every portion of the mold that comes in contact with the molten metal. The purpose

of this is two-fold, to provide a sufficient heat storage capacity so that the molten metal can be robbed of its heat in the shortest possible time and to make the mold strong enough to resist the tremendous expansive power of the cooling metal. The matrix and the core should be made to the exact size of the casting before finishing. Make no allowance for shrinkage. Why there is no apparent shrinkage when these castings are made in a permanent mold is a moot subject. It may be that since the interior of the casting is molten when it is taken from the mold and the outside contraction has not started at the time of removal, that the expansive force of the cooling interior metal will neutralize the contracting force of the cooling exterior. It is a very interesting point, but it is true that when the casting is so thick that the interior is molten at the time of removal, shrinkage may be safely ignored.

Mold Should Open Easily

As a further item of design, the mold should be so equipped as to be easily and quickly opened and closed. The movable portions should run on grooved wheels fitting V-shaped tracks. The purpose of this is to prevent small particles of iron interfering with the adjustment of the moving parts. Casting is apt to be a sloppy proceeding and there are always small particles of iron splashing around. Mount the molds so that there is plenty of space underneath to collect any molten metal that may carelessly escape. Before closing the mold, run a flat scraper over the face to remove any small particles that may adhere. If these general rules are followed out, two 60-pound shells can be cast every minute and all will be of the same weight, size and texture.

There is one very important point in the manufacture of cast-iron shells that must be considered and that is the position of the copper revolving band. In some steel shells this band is placed within a very short distance of the base, but in a cast-iron shell, plenty of metal must back up the band. Even with the strength that steel gives, portions of the base are sometimes torn off by the tremendous force set up when the band enters the rifling at a very high velocity. The effect of this rupture is to disturb the trajectory and direction to such an extent as to render the shell not only useless, but dangerous. When the guns are behind the line, pieces of the band, base and even the projectiles may fall into friendly ranks with disastrous results. In a 5-inch shell, the distance between the band and the base must be at least 2½ inches and the band must be sunk into the body of the shell only sufficiently deep to hold it in position. If this point is not observed, the cast-iron shell will be a failure.

When the large projectiles are cast, there is a tendency to form wrinkles on the exterior and interior of the casting due to the surge of the metal while pouring. This is an annoying feature, but the remedy is to make the main runner, where it enters the trap, the controlling factor. If the diameter at that point be kept so small that the main runner can be kept full of molten metal during the entire pouring, these wrinkles will not be in evidence.

The question arises as to the use of steel in permanent molds for the purpose of making shells. The added strength of this metal and the ease with which it can be brought to specifications in the open hearth, is certainly attractive. There is no doubt as to the suitability of steel for this work and it will readily pour in a permanent mold. Moreover, it is not hardened or weakened by the action of the mold. The grain is very fine and it yields exceptionally well to heat treatment. The main difficulty is that the process of casting in a permanent mold is a continuous performance, while the melting of steel in an open hearth is more or less intermittent. The steel when it comes from the open hearth must be poured without delay and after the metal in the ladle is poured, there must elapse an interval of hours before the next heat is ready. Furthermore, the economical melting of steel demands that it be made in furnaces of large tonnage and to pour this tonnage within the time limit within which the steel remains sufficiently molten to work, would require an immense number of molds and an elaborate and costly equipment to handle the ladles, operate the molds and take care of the castings. If the melting of steel can be economically accomplished, so that a continuous supply of molten metal is available, then the manifest advantage of steel over cast iron can be utilized.

When steel is cast in a permanent mold, an allowance must be made for shrinkage, as there is not the same initial expansion as is the case with cast iron. A greater bulk of mold must be provided to take care of the higher temperature and the gates, trap and runners must be given a coating of heavy clay wash after each pouring. This is necessary to prevent cutting the mold. A very slight under cut will put the mold out of business until repairs can be made. Once the "sting" of the molten metal is taken away by the runners, gates and trap, steel will do no harm to the matrix.

The French government has issued specifications for shells cast in sand that are here given in part. They call for the analysis of shells of 122 to 155 millimeters caliber. The chemical analysis is as follows:

	Per cent
Graphitic carbon	0.70
Combined carbon	2.40
Silicon	1.35
Manganese	0.70

The amount of total carbon and silicon must not exceed 4.7 per cent. If this limit is exceeded, the iron will lack toughness. At least 2 per cent of the total carbon must be combined to produce proper fragmentation. The percentage of dust increases as the combined carbon decreases.

Variation of Silicon Content

Although the sum of total carbon plus silicon is set at 4.7 per cent, it is preferable to keep these limits to 4.4 per cent with a minimum percentage of silicon. The percentage of silicon varies according to the type of molding. In the 122-caliber the best results were obtained by using a minimum of 1.20 per cent silicon for dry sand and 1.35 per cent for green sand. The percentage of silicon varies in inverse ratio to the thickness of the walls and the caliber, the thicker the wall, the higher the caliber, the lower the silicon. Manganese decreases with the thickness of the walls and caliber and increases with the sulphur.

The sulphur should never exceed 0.08 per cent and should be lower whenever possible. The percentage of phosphorus is set at 0.15 per cent or under. The charge should be as follows:

	Per cent
Pig iron	40
Scrap	40
Steel	20

The term scrap is used to denote scrap melted, pigged and charged according to analysis.

These specifications correspond closely to the iron previously mentioned as being ideal for use in permanent molds. The striking point in the specifications is that the silicon decreases when a dry-sand mold is used, and this point is emphasized by the use of a still lower silicon in a permanent mold. The percentage of combined carbon will always be high when a permanent mold is used. Once the proper mixture has been determined, that mixture is used irrespective of the thickness of walls or caliber of shell.

All the foundries of France engaged in this work, have been mobilized on

a common basis and are using precisely the same methods of selection, analysis and general foundry procedure. This has not been done without enormous losses and vexatious delays, there have been many cases where the loss of the total heat has been reported and a loss of 40 per cent was not uncommon in the first stages. Team work, scientific methods and keeping everlastingly at it, have brought results. Today the output has reached staggering proportions—over 1,000,000 rounds per day are being made.

Starting from the pig, the manufacture of a steel forging involves many operations and a huge outlay for equipment. The steel is made, poured into ingots, rolled into rounds, cut into blanks, heated to the forging temperature, pressed into the rough shape, pierced and run through a draw bench before the forging is ready for machining. A shell cast in a permanent mold and starting from the pig has but two operations—melting and molding. The heat treatment of the steel shell before machining is completed is balanced by the heat treatment of the cast-iron shell before machining.

Shell Castings Cheaper

A steel forging for a 4.7-inch shell costs over $7.00 at the present writing, while a casting for the same shell can be made for a little over $2.00. Furthermore, a liberal saving in labor and machine-tool consumption can be effected. When larger projectiles are made, a larger proportionate saving will follow. When more than 1,000,000 rounds per day are made, and this is a low figure to expect, the difference in cost seems incredible. If $6,000,000 or $7,000,000 are spent each working day for shells alone, the incentive for saving a substantial portion of this tremendous outlay becomes a vital necessity especially when the cheaper shells will give as good if not better service than the more costly ones. There is no comparison between the shells when the question of output is considered. Taking dollar for dollar invested in equipment, the output of cast-iron shells is 10 times greater than the output of steel forgings.

The low cost, great output per day and the effectiveness of cast-iron shells have been so completely recognized that two of the warring nations are using them to an enormous extent. France is casting them in sand and Germany, from the best information available, is casting them in permanent molds.

It is doubtful if there is a foundry in the United States that could qualify at once for this work without material changes in procedure. Primarily, it is not a commercial proposition and if this government decides to use cast-iron shells, the work must be undertaken with the foreknowledge that trouble is ahead. The necessity will be paramount of not only putting forth prodigious efforts but also of sinking individuality for the common good. A full and free interchange of ideas and data is indispensable. There is no doubt of the ultimate outcome, but if the experience of those who have been through the mill is utilized, a deal of time, trouble and treasure will be saved.

Cuyuna Manganiferous Iron Ores

IN VIEW of the gradually decreasing known reserves of high-grade manganese ore and the rapidly increasing consumption of iron-manganese alloys in the steel industry, it is well to turn our attention to the development of low-grade manganiferous ore deposits and to the utilization of these ores in steel manufacture. The dependence of this country on imported manganese ore and ferromanganese has been forcibly brought to the attention of steelmakers during the last few years by the cessation of manganese-ore imports from Russia, the restriction of manganese-ore imports from India and of ferromanganese imports from Europe. Should the importation of manganese ore from Brazil cease, the steel industry of this country would face a serious situation. The present practice of steelmaking requires ferromanganese in large quantities and ferromanganese of the grade used at present can be produced only from high-grade manganese ores such as the United States appears to possess only in insignificant amounts. There are in the United States, however, large reserves of manganiferous iron ore which could probably be used extensively in the steel industry if certain changes in the practice of steel manufacture were made. Thus high-grade manganese ore could be conserved. Among the most important deposits of manganiferous iron ore in this country are those of the Cuyuna iron-ore district of Minnesota. It is probable that in case of restriction of foreign supplies, the users of manganese in the United States would have to rely to a large extent on the Cuyuna district to make up the shortage.

Manganiferous iron ore was found in association with iron ore in the Cuyuna district in many of the early drilling operations and the possibility of its utilization was in the minds of various explorers in the district for a long time before mining operations were begun. Many drill holes in the northern part of the district passed through iron-bearing formation containing varying amounts of manganese. The distribution of the manganese was found to be very irregular, however. In certain drill holes high-grade manganiferous iron ore, containing 25 per cent manganese and over, was encountered, while nearby holes showed little or no manganese. Even in the same hole great variations were found in the manganese content of the ore. Ore with more than 20 per cent of manganese was found to be irregularly intermixed with material containing 2 or 3 per cent of manganese or even less. Generally the iron content was found to be high when the manganese content was low and *vice versa*, so that the combined iron and manganese content was fairly regular. In many drill holes, however, material was encountered which was abnormally high in silica and low in combined iron and manganese.

In view of this situation and of the lack of demand for manganiferous iron ore in the industries, the mining of these ores was discouraging for a long time, and iron ores containing an appreciable amount of manganese were considered almost worthless. In 1911, however, the shaft of the Cuyuna-Mille Lacs Iron Co. was sunk and in 1913 the first manganiferous iron ore produced in the district was shipped from this mine. In 1913 a second shaft, that of the Iron Mountain Mining Co., was sunk and a few carloads were shipped from this mine for experimental purposes during the same year. The production gradually increased in succeeding years and as the supply of manganese in the country diminished due to war conditions, and its price rose, the demand for Cuyuna range manganiferous iron ores increased. During the coming season, such ores will probably be produced from 14 or 15 mines in the district.

While this increase of demand for Cuyuna range manganiferous iron ore has been produced largely under abnormal conditions, it seems probable that its extensive use in the industries will result in certain changes of metallurgical practice and it is a live question

Abstract of paper to be presented at St. Louis meeting of the American Institute of Mining Engineers, St. Louis, October, 1917. The author, E. C. Harder, is associated with the United States geological survey.

whether on account of such changes the demand for these ores will continue when normal conditions are re-established. In general it may be said that as regards grade there are two principal classes of manganiferous iron ores in the district: (1) low-phosphorus ores, usually high in silica, and (2) high-phosphorus ores which are generally moderately low in silica. In the accompanying table are grouped a large number of analyses of manganiferous iron ores taken from practically all the known manganiferous iron-ore deposits in the north range. Many of them represent samples taken in drilling while many of them are of samples taken in mines. They were selected to show the general range in iron, manganese, and phosphorus content and in some cases the silica content as well. In most instances, in order to show the range of these constituents several analyses are given of ores which have the same manganese content but which show differences in the percentage of iron and phosphorus. Only ores in which the combined iron and manganese content is more than 50 per cent are included in the table, although much ore is being shipped at the present time in which the combined metallic content is considerably less.

The analyses show the great variation in the manganese content of the ores. They show also that ore containing a given percentage of manganese may vary greatly in the amount of the other constituents present, especially the phosphorus. Aside from minor irregularities, the iron content decreases with increase of manganese content. while the silica decreases with increase in content of combined metals, and *vice versa*. The phosphorus content shows no such regularity, the variations being independent of the iron and manganese content. In general, however, it may be said that the ores which are highest in manganese are usually of the class of low-phosphorus ores.

Analyses of Manganiferous Iron Ores

FROM THE NORTH RANGE, CUYUNA DISTRICT, SHOWING RANGE IN PERCENTAGE OF DIFFERENT CONSTITUENTS

Mn	Fe	P	SiO_2	Combined Fe and Mn	Mn	Fe	P	SiO_2	Combined Fe and Mn
1.01	30.75	0.276	....	51.76	18.55	39.78	0.056	....	58.33
1.16	55.92	0.091	8.24	57.08	19.40	35.01	0.128	....	54.41
1.49	50.66	0.122	....	52.15	19.76	35.48	0.041	....	55.24
2.37	55.69	0.391	....	58.06	20.53	32.44	0.076	9.95	52.97
2.42	54.45	0.034	....	56.87	20.73	31.25	0.075	12.94	51.98
2.44	56.42	0.134	....	58.86	21.70	33.52	0.027	....	55.22
3.13	58.76	0.123	....	61.89	21.75	30.68	0.060	....	52.43
3.61	51.36	0.058	....	54.97	21.80	30.27	0.211	....	52.07
4.49	51.90	0.085	9.25	56.39	22.51	34.06	0.058	9.94	56.57
4.96	46.52	0.044	....	51.48	22.63	34.86	0.105	....	57.49
5.09	55.58	0.023	....	60.67	23.45	27.27	0.059	....	50.72
5.16	50.64	0.107	....	55.80	23.63	35.38	0.062	9.69	59.01
5.90	49.75	0.324	....	55.65	23.70	30.66	0.258	....	54.36
6.75	54.53	0.021	....	60.28	24.12	34.33	0.087	....	58.45
6.76	47.58	.....	11.65	54.34	24.32	33.87	0.240	....	58.19
6.81	45.22	0.173	....	52.03	24.36	30.85	0.066	....	55.21
7.63	47.26	0.139	....	54.89	25.00	30.61	0.076	....	55.61
7.98	47.36	.....	13.97	55.34	25.19	30.96	0.141	....	56.15
8.02	53.93	0.029	....	61.95	25.59	31.05	0.333	....	56.64
8.05	52.59	0.212	....	60.64	26.20	31.19	0.080	....	57.39
9.18	44.03	0.028	....	53.21	26.21	31.20	0.294	....	57.41
9.45	48.37	0.076	....	57.82	26.62	36.55	0.051	....	63.17
9.48	47.03	0.325	3.18	56.51	27.15	31.91	0.064	....	59.06
10.72	44.07	.....	12.39	54.79	27.52	28.27	0.156	....	55.79
10.84	39.38	0.061	....	50.22	27.88	23.20	.....	16.22	51.08
11.08	44.41	0.021	....	55.49	28.11	27.94	0.172	....	56.05
11.51	45.90	0.152	....	57.41	28.75	31.56	0.083	....	60.31
12.14	41.07	0.138	....	53.21	29.51	22.03	0.121	....	51.54
12.31	41.96	0.036	....	54.27	29.92	22.71	0.073	....	52.63
13.91	38.05	0.050	....	51.96	30.10	28.89	0.041	....	58.99
13.95	40.90	0.023	....	54.85	31.46	28.22	0.043	6.72	59.68
14.65	40.56	0.045	....	55.21	31.50	32.42	0.063	....	63.92
14.90	38.48	0.279	....	53.38	32.40	31.24	0.038	....	63.64
14.91	38.20	0.307	....	53.11	33.28	25.48	0.034	8.85	58.76
15.06	38.79	0.046	....	53.85	33.44	18.08	0.088	....	51.52
15.37	34.74	0.062	15.10	50.11	33.66	27.36	0.129	....	61.02
16.30	35.00	0.140	....	51.30	34.10	22.34	0.046	....	56.44
16.96	38.67	0.088	....	55.63	34.83	24.69	0.059	9.29	59.52
17.18	33.71	0.041	13.44	50.89	35.85	24.96	0.043	....	60.81
17.55	39.25	0.255	....	56.80	36.90	17.72	0.032	....	54.62
18.00	32.37	0.198	13.60	50.37	37.94	19.93	0.071	....	57.87
18.00	37.03	0.085	12.72	55.03	.....	.....	.....	....	.....

The Chinese government recently granted the request of the Hanyehping Corp., a large iron and steel producer, for an extension for five years (to 1921) of its exemption from all classes of taxation.

Ferro Carbon-Titanium

To the Editor:

The able and interesting article by Robert J. Anderson, entitled "Metallurgy of Titanium Ferro Alloys", printed in your issue of Aug. 16, 1917, pages 335-338, may, probably be beneficially amplified by the following references to distinctions between the old so-called ferro titanium alloys and the comparatively new ferro carbon-titanium compounds too indiscriminately (as it seems to the writer), referred to in said article.

The new term "Ferro Carbon-Titanium" was adopted by this company to distinguish its present improved titanic-purifier products (U. S. Letters Patent Nos. 1039672, 1056125 and 1094022 of 1912-13) from those initially sold by it and known to the trade as "Ferro-Titanium" (U. S. Letters Patent 609466 of 1898, etc.).

Until the inventions resulting in our later patents, the, to an extent mistaken desideratum was a purifier product the titanic constituent of which should be as far as possible in its elemental, metallic form, *i. e.*, titanium, the resulting ferro to be a true alloy properly designatable as "Ferro-Titanium". This view was revolutionized by our inventions, based on the discovery of several advantages derivable from, having the titanic constituent, as far as possible, in the form of carbide of titanium. Among these advantages may be noted economy in manufacture, and particularly in purifying and the great advantage of more homogeneous distribution.

Mr. Anderson has in his article (page 335) apparently misapplied our term "Ferro Carbon-Titanium" to the four samples (Titanic content not specified) analysis of which he prints as regards their contents of graphite and combined carbon. These we infer would have been more properly designated as samples of our former "Ferro-Titanium". Our present ferro carbon-titanium, on the other hand, seems more properly designatable as a *compound*, than as an alloy, and it is to this compound that the complete analysis refers which Mr. Anderson rightly refers to as being "according to" us (See page 3 of our booklet, "Ferro Carbon-Titanium in Steel-Making", 1916), and to which, in view of the foregoing, we may add that its stated 7.46 per cent carbon is shown by analysis to consist of about 3.10 per cent graphitic carbon and the remainder, 4.36 per cent of combined carbon; the combined carbon is mostly in the form of titanium carbide.

A. Thompson, *General Manager*,
The Titanium Alloy Mfg. Co.,
Niagara Falls, N. Y.

New Valves Solve Blowing Problems

Substitution of Modern Plate Valves in Existing Blast-Furnace Blowing Equipment Often Leads to Increased Air Capacity and Greater Pig Iron Output — Data on Specific Cases

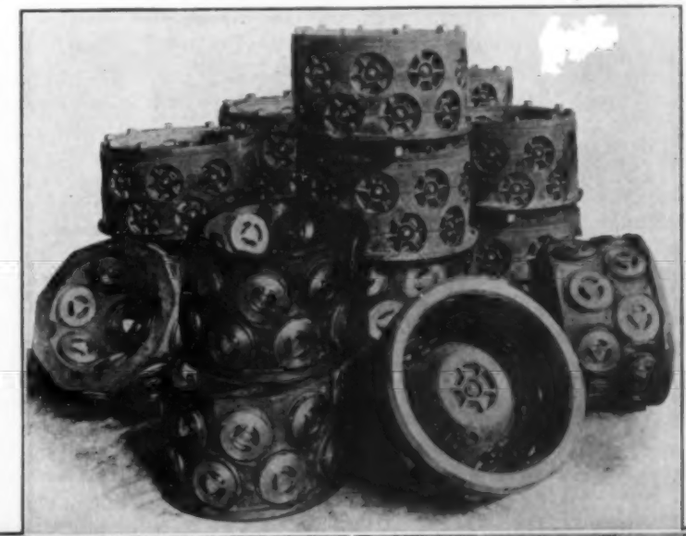
IN BLOWING engines for blast furnaces, the course of development recently has been following rather unexpected lines. A comparison of the number of new furnaces built with the number of new blowing engines and new turbo-blowers installed indicate that a comparatively small amount of new blowing equipment has been added. This surprising result is explained by the fact that a very large number of existing blowing engines have been rebuilt in such a way as to have a larger capacity and to serve a greater number of furnaces than heretofore. The possibility of increasing the capacity of existing blowing engines is largely due to the increase in piston speeds made possible by the introduction of plate valves which have been mentioned before in our columns. By far the greatest amount of rebuilding of existing blowing engines has been done by the Mesta Machine Co., Pittsburgh, with plate valves manufactured under the Iversen patents.

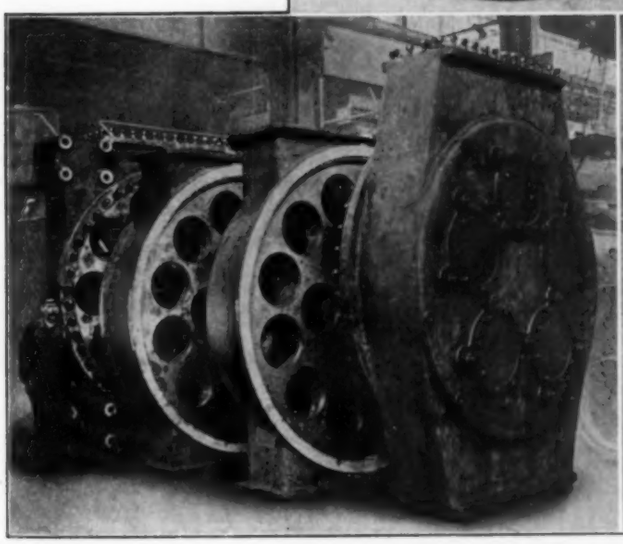
The so-called rebuilding of blowing engines is, in some cases, limited to the simple replacing of the existing valves by automatic plate valves. In other instances it means much more, involving the removal of the old cylinder heads, replacing them by heads containing plate valves. In the most extreme cases it means the removal of the whole air end including the air cylinder.

An illustration of the methods employed in replacing an old type of valve by plate valves is shown in Fig. 1. This shows plate valves arranged in cages, which take the place of large poppet valves, originally operating in the head. The cages are dished in order to reduce the clearance to a very small amount. In many cases, the clearance volume is smaller than it was with the original valves, while in other cases it is increased slightly, depending upon the type of valves being replaced by the cages. But even in this latter case, the advantages gained by the instantaneous opening of the valves, and the larger area secured, are believed to be so overwhelming, that the slight increase in clearance volume is not detrimental.

The arrangement of the valves in cages is said to offer several advantages. The removal of one cover plate exposes all outlet valves of the cage to inspection on the delivery side. The inlet cages are made in two parts so that the removal of one cover and the top of a cage exposes all the valves of that cage to inspection. In the rare case of breakage of a valve, the whole cage can be easily removed and replaced by a spare one.

Fig. 4 shows how valves have been made to fit a segmental arrangement of old valves. Fig. 5 illustrates the method of installing valves in place of existing valves in the head.





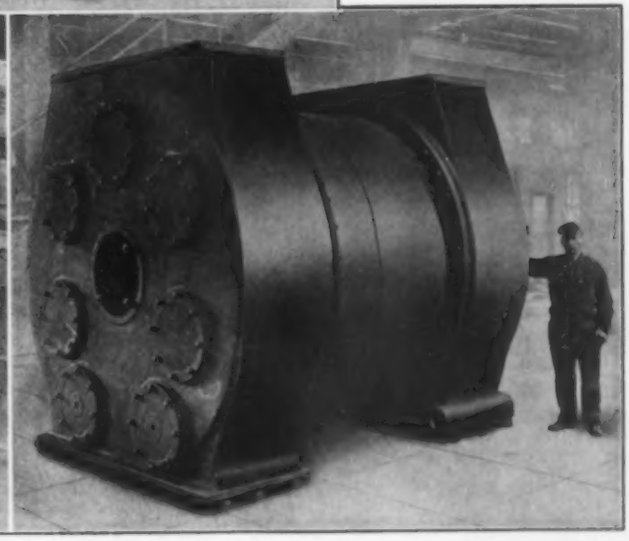


FIG. 1—PLATE VALVES ARRANGED IN CAGES FOR CONVENIENT INSTALLATION. FIG. 2—NEW AIR HEADS WITH PLATE VALVES. FIG. 3.—NEW AIR END DESIGNED TO REPLACE OLD PART.

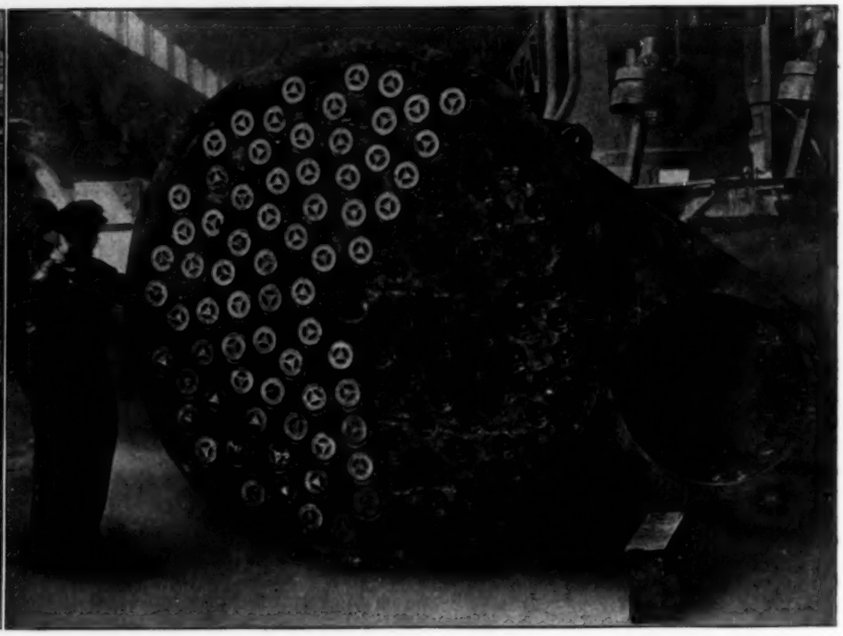


FIG. 4—PLATE VALVES ARRANGED TO FIT SEGMENTAL ARRANGEMENT OF OLD VALVES. FIG. 5—PLATE VALVES INSTALLED IN EXISTING HEAD.

This latter method as a rule gives some increase in valve area, but not enough to warrant increasing the speed of the engine materially. This method is to be recommended particularly in the case of old blowing engines equipped with leather valves. The advantage is twofold; first, the plate valves are always tight and in consequence deliver more air, whereas leather valves soon begin to leak, due to warping or charring of the leather; second, higher pressure can be blown.

The second method, namely, that of replacing old air heads with new ones, is very widely followed at the present time. Fig. 2 shows the appearance of such air heads. The third and last method, namely, that of replacing the old air end has been necessary only very occasionally. Fig. 3 shows the appearance of such an air end.

Advantages of Plate Valves

The possibility of using higher piston speeds with plate valves already has been mentioned. This is beneficial in several ways. Right now, due to the poor grade of coke available, many furnaces are obliged to use more air than in the past when better coke was on hand. Increasing the supply of air has pulled several furnaces out of bad predicaments. More air means not only more pig iron, but in addition, more furnace gas, more steam, less coal required at boilers and steady, profitable operation. The installation of plate valves, and the resulting possible increase in blowing-engine speed, has enabled a number of plants to erect another furnace without installing additional blowing units. The practice customary heretofore of blowing a furnace with three or sometimes four tubs, has given way to the present possibility of blowing a furnace with only two tubs. A great many furnaces in this country are being blown today, using only two 84-inch diameter blowing tubs equipped with automatic plate valves. In other words, the blowing capacity of existing plants often can be increased 50 to 100 per cent by equipping the present engines with automatic plate valves.

Standards for Ladle Sleeves and Stoppers

ONE of the most interesting reports submitted at the Boston meeting of the American Foundrymen's association was that of the committee on steel foundry standards. This report, which recommends new standards for ladle sleeves and stoppers was unanimously adopted. The report in full is as follows:

Standard Product of Value

"During the past year, the committee on steel foundry standards selected as its problem for investigation the standardization of standard sleeves, special sleeves and graphite ladle stopper heads, all of which is a sequel to the report on the standardization of ladle nozzles submitted at the Chicago convention in 1914.

"The standardization of ladle nozzles has been of inestimable value to both users and manufacturers. In these stirring times of top-notch production, the assurance of being able to obtain a standard product, rather than to have to wait for the manufacture of special designs has been a source of incalculable value and satisfaction.

"The committee, this year, proceeded much along the same lines as the original committee, obtaining an expression from 30 or 40 steel foundries indicating their practices. We found widely diversified opinions as to what constitutes good practice in stopper-rod equipment design. We also found that in some instances this all-important function of ladle equipment has received little or no consideration.

Wall Thickness Insufficient

"We found, in general, that the thickness of the walls at the base of the special sleeves is insufficient. With the varying degrees of burning on the part of the sleeve manufacturers, this thin wall is often underburned and very fragile, causing disintegration at the temperature of molten steel. This permits the steel to find its way to the stopper-rod pin, often resulting in the loss of a stopper head. We also found that many foundries use a stopper head

with only a short wall offset of 3/8-inch. We believe this dimension should be increased to 1 5/8 inches to secure a better fit between stopper head and sleeve and a better alignment of the stopper head with the rod.

Recess Depth Increased

"We also found that the dimension for the insert of the stopper head and the recess of the special sleeve was the same. To safeguard against variations in depth and unevenness in the bearing faces of the recess of the special sleeve, we have recommended that the depth of the recess be made 1/8-inch greater than the height of the stopper head insert. To make it certain that the total stress and shock will not be carried by the shoulder of the stopper head, we would suggest that a wadding or filler of clay be inserted between the top of the stopper head and the bearing face of the special sleeve.

"We realize full well that the recommended standards are quite a departure from the past practices of many foundries. We, however, urgently solicit the trial and co-operation of all foundries in their adoption and use. Your committee has made no recommendations or specifications covering the character of the clay composition or the degree of burning. The refractory manufacturers are more familiar with the nature of their raw material and the required burning than we are.

"A table covering a survey of the practice of various steel foundries and sketches showing the recommended standards are presented herewith."

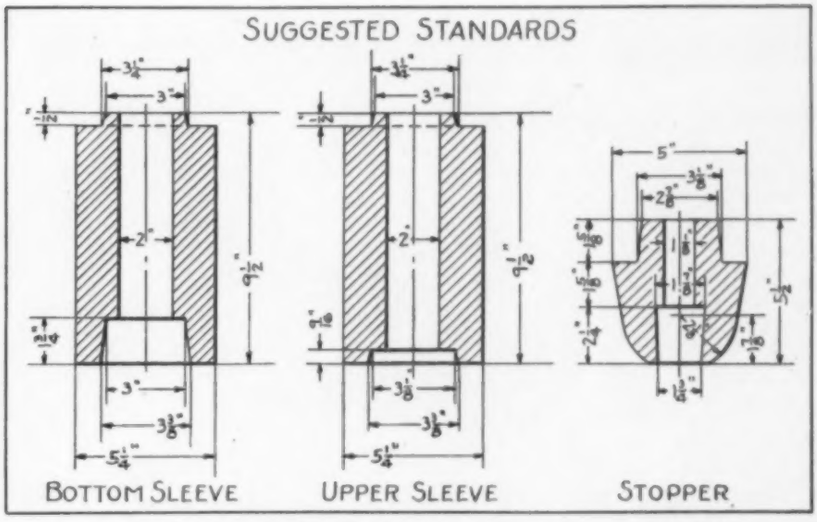


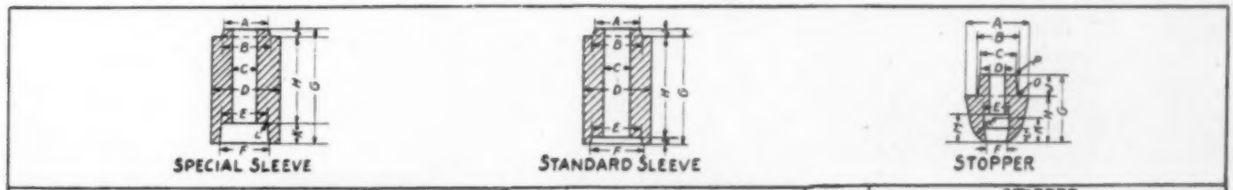
FIG. 2—SUGGESTED STANDARDS FOR SLEEVES AND STOPPERS

Electrical Business Booms in Japan

According to the latest investigation made by Japanese authorities the number of electrical enterprises in Japan is estimated at 642, with a total capital of approximately $330,000,000. These enterprises utilize about 900,000 kilowatts. These figures show an increase of 260 per cent in number of enterprises, 400 per cent in amount of capital and 380 per cent in kilowatts consumed, over those of 10 years ago. An increase in water power is said to be responsible for the great boom in electrical enterprises.

Until recently, electric power was used mostly in Japan for the purpose of lighting and running street cars, its use as a motive power in general industries being restricted. However, through the impetus given as a result of the European war, industrial motors in Japan at the end of last year were utilizing 600,000 kilowatts. In the electrochemical industry, it is said the figures jumped from 28,000 kilowatts, which constituted the total power used at the end of 1915, to 58,000 kilowatts by the end of 1916.

The electrical supplies made in Japan are now chiefly exported to China, Siam, India, Australia and the South Sea islands. From the United States Japan still buys steel sheets, hydraulic and steam turbines, insulated wire, tungsten lamps, generators, motors, transformers, etc.



NAME OF FOUNDRY	SPECIAL SLEEVE A	B	C	D	E	F	G	H	J	K	L
AMERICAN STEEL	3	3 1/4	2	5 1/4	2 1/8	3 1/4	9 1/4	7	1/8	2	50
BETTENDORF CO.	3 1/4	3 1/8	2 1/4	5 1/8	3 1/2	3 1/8	9 1/2	7 1/8	1/2	1 1/2	1/8
BIRDSBORO STEEL CO.	TAPER + SEE SKETCH										
BUCKEYE STEEL CO.	3 1/4	3 1/8	2 1/4	5	3 1/2	3 1/8	9 1/8	7 1/8	1/2	1 1/2	
BUCYRUS CO	2 1/4	2 1/8	1 1/8	4	2 1/8	2 1/8	8 1/8	7 1/8	3/8	3/8	
CLEVELAND STEEL CO.	2 1/4	3/8	2 1/4	5	2 1/4	3 1/4	9	6 1/2	1/2	2	1/8
COMMONWEALTH STEEL CO.	TAPER- SEE SKETCH										
DETROIT STEEL CO.	3	3 1/8	2 1/8	5 1/8	2 1/8	3 1/8	9 1/8	7 1/8	3/4	2	
DUQUESNE STEEL CO.	2 1/8	3	2	4 1/2	2 1/8	3	8 1/8	7	1/8	1	50
FALK CO.	NOT USED										
GOULD COUPLER CO.	3 1/8	3 1/4	2 1/8	5	2 1/8	3 1/8	9 1/8	7 1/4	1/2	1 1/8	
JONES & LAUGHLIN	NOT USED										
McCONWAY & TORLEY CO.	2 1/4	2 1/8	2	4	2 1/8	3	8 1/8	7 1/2	5/16	1/2	
MESTA MACHINE CO.	TAPER + SEE SKETCH										
OHIO STEEL CO.	"			"		"					
OTIS STEEL CO.	2 1/8	3 1/4	2	5	2 1/8	3 1/8	9 1/8	8 1/8	1/2	1/2	
PENN SEABOARD	3 1/8	3 1/4	2	4 1/2	3 1/4	3 1/2	8 1/8	7 1/4	3/16	3/16	
SCULLIN STEEL CO.	SEE SKETCH										
STRONG STEEL CO.	3 1/8	3 1/8	2 1/8	5	2 1/8	3 1/8	9 1/8	7 1/4	3/16	1 1/4	
UNION STEEL CO.	TAPER-SEE SKETCH										
WEST STEEL CO.	NOT USED										

DIMENSION IN INCHES

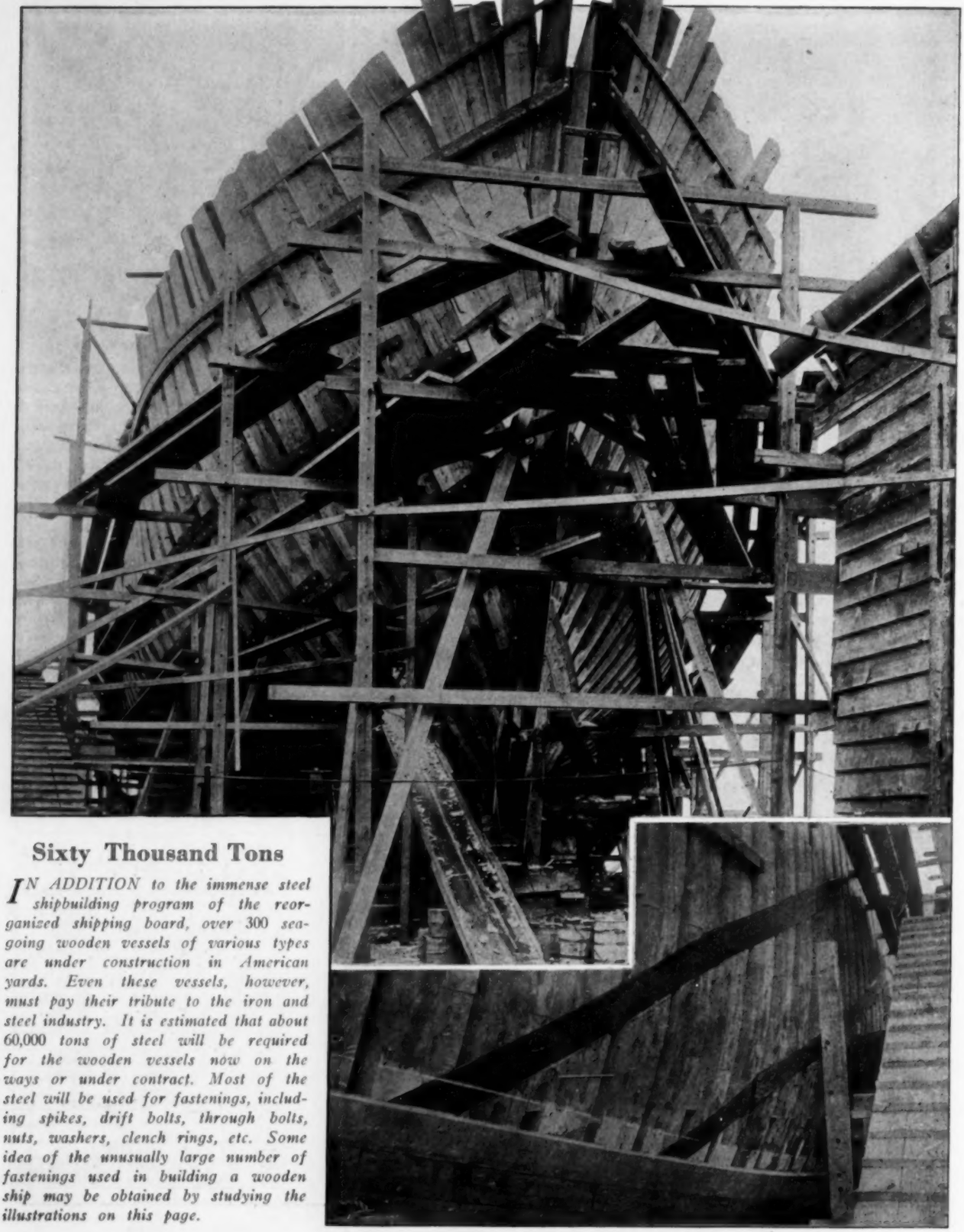
STANDARD SLEEVE A	B	C	D	E	F	G	H	J	K
3	3 1/4	2	5 1/4	3 1/8	3 1/2	9 1/8	8 1/8	1/8	1/2
3 1/8	3 1/8	2 1/8	5 1/8	3 1/8	3 1/2	9 1/8	8 1/2	1/2	3/16
2 1/8	3	2 1/4	4	2 1/8	3 1/4	8 1/8	7 1/8	3/16	1/2
3 1/4	3 1/8	2 1/8	5	3 1/8	3 1/2	9 1/8	8 1/2	1/2	1/2
2 1/8	2 1/8	1/8	4	2 1/8	2 1/8	8 1/8	7 1/8	1/8	1/8
2 1/8	3 1/8	2 1/4	4 1/8	3	3 1/2	9 1/8	8 1/8	1/2	1/2
3 1/8	3 1/4	2 1/8	6	3 1/2	3 1/8	8 1/8	7 1/8	1/8	1/2
3	3 1/4	1 1/2	5	3 1/4	3 1/4	9 1/8	8 1/8	1/8	3/16
2 1/8	3	2	4 1/2	2 1/8	3 1/4	8 1/8	7 1/8	3/16	1/2
2 1/2	3	2	4 1/2	2 1/2	3	9 1/2	8 1/2	1/2	1/2
3 1/8	3 1/4	2 1/8	5	3 1/8	3 1/8	9 1/8	8 1/2	1/2	1/2
3 1/8	3	2 1/8	4 1/2	3 1/8	3 1/8	9	7 1/8	1/2	3/8
2 1/8	2 1/8	2	4	2 1/4	3	8 1/8	7 1/8	3/16	1/2
2 1/8	3 1/8	2 1/8	4 1/2	3 1/4	3 1/8	9 1/8	8	1/8	1/2
2 1/8	2 1/8	2 1/8	5	2 1/8	3 1/8	9 1/8	8 1/8	3/16	1/2
2 1/8	3 1/8	2	4 1/2	2 1/8	3 1/8	9 1/8	8 1/2	1/2	1/2
3 1/8	3 1/4	2	5	3 1/4	3 1/8	8 1/8	7 1/8	3/16	3/16
3 1/8	3 1/4	2 1/8	6	3 1/2	3 1/8	9 1/8	8 1/8	1/8	1/2
3	3 1/2	2 1/8	4 1/8	3	3 1/2	9 1/8	8 1/8	1/2	1/2
TAPER+SEE SKETCH									
2 1/8	2 1/8	1 1/8	4	2 1/2	2 1/8	8 1/8	7 1/8	1/8	1/8

STOPPER A	B	C	D	E	F	G	H	J	K	L	M	N	O	P
5 1/8	3	2 1/8	1 1/8	2 1/4	1 1/8	5 1/8	4 1/8	1/8	2 1/8		2 1/8	2 1/8	50	50
5	3 1/8	3 1/8	1 1/8	1 1/8	1 1/8	5 1/8	4	1 1/2	1 1/8	1 1/8	2 1/8	2 1/8	1/8	1/8
SPECIAL+ SEE SKETCH														
5	5 1/8	3 1/8	1 1/8	1 1/8	1 1/8	5 1/8	4	1 1/2	1 1/2	1 1/8	2 1/8	1 1/8		
3 1/8	2 1/8	2 1/8	5/8	1 1/8	1 1/8	4 1/8	3 1/8	1/16			1 1/2	1 1/16		
4 1/8	3 1/4	2 1/8	1 1/2	2 1/8	1 1/8	5 1/2	3 1/2	2		1 1/2	1 1/8	1/8	1/16	1/16
SPECIAL- SEE SKETCH														
4 1/8	3 1/8	2 1/8	1/8	2	1 1/8	5 1/8	3 1/8	1/8	2 1/8	1 1/16	2 1/8	1 1/2	1/8	
4	2 1/8	2 1/8	1	1 1/8	1 1/8	4 1/8	3 1/4	3/8	1 1/2	1	1 1/8	1 1/2	50	50
4 1/8	2 1/8	2 1/8	7/8	1 1/16	1 1/8	5 1/8	3 1/2	3/16			1 1/8	1 1/16		
5	3 1/16	2 1/8	1	1 1/8	1 1/2	5	3 1/8	1 1/16	3/16		1 1/8	1 1/2		
4 1/8			1 1/8	2 1/8	1 1/16	4 1/8					1 1/8			
4 1/8	3 1/8	2 1/8	5/8	1 1/8	1 1/8	4 1/8	4 1/8	3/8	1 1/2		2 1/8	1 1/2		
4 1/8	3 1/8	2 1/8	1 1/8	2	1 1/8	5 1/8	4 1/8	1	1 1/8		1 1/8	1 1/8		
4 1/8	2 1/8	2 1/8	1	1 1/2	2 1/8	6 1/8	4 1/8	2	2 1/8		2 1/8	1		
4 1/8	3 1/8	2 1/8	7/8	1 1/8	1 1/8	4 1/8	4 1/8	3/8	1 1/4		2 1/8	2		
5	3	3	1	1 1/2	1 1/8	3 1/8	3 1/8	3/8	2 1/8		1 1/8	2 1/2		
4 1/2	3 1/4	2 1/8	1	2	1 1/2	4 1/8	4	3/8			2 1/8	2		
5 1/8	3 1/4	2 1/8	1	2 1/8	1 1/8	5 1/8	3 1/2	1 1/8	2 1/8	1	2	2 1/2		
4 1/8	3 1/8	2 1/8	2 1/8	1 1/8	1 1/8	5 1/8	3 1/8	1/8		1/8	2	2 1/8	1/8	1/8
4	2 1/8	2 1/8	7/8	1 1/8	1 1/2	4 1/8	3 1/8	3/8	1	1/8	1 1/8			

FIG. 1—DIMENSIONS OF SLEEVES AND STOPPERS IN USE AMONG VARIOUS FOUNDRIES

Tons of Steel Are Used in Wooden Ships

Special Steel Reinforcing Plates Are Necessary

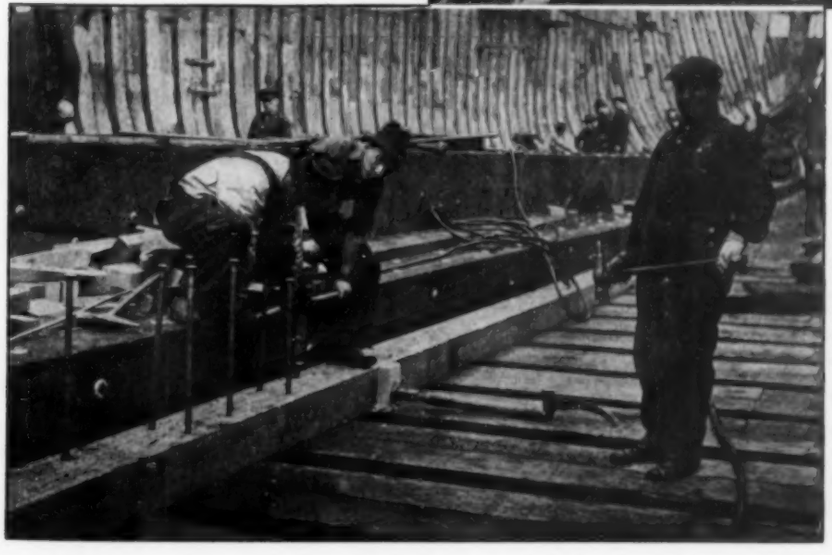


Sixty Thousand Tons

IN ADDITION to the immense steel shipbuilding program of the reorganized shipping board, over 300 seagoing wooden vessels of various types are under construction in American yards. Even these vessels, however, must pay their tribute to the iron and steel industry. It is estimated that about 60,000 tons of steel will be required for the wooden vessels now on the ways or under contract. Most of the steel will be used for fastenings, including spikes, drift bolts, through bolts, nuts, washers, clench rings, etc. Some idea of the unusually large number of fastenings used in building a wooden ship may be obtained by studying the illustrations on this page.

Steel Straps Add Strength

IN ORDER to provide the necessary strength, large wooden vessels must be reinforced with steel straps. Universal plates 14 inches wide and ¾-inch thick are sometimes used. The arch rises amidships to a point 3 feet above the main deck. At both ends, the straps run down to the line of the bilge. In addition, the deck beams are tied together by ¾ x 4-inch steel straps laid in four courses the full length of the ship. This strapping is rather expensive, the type shown in the illustrations on this page costing about $3000 including $1500 for labor and fastenings. This form of reinforcing, however, is not nearly as elaborate as that provided in the standard design of the United States Shipping Emergency Fleet Corp. This design provides for a lattice work of steel straps, ½ x 4 inches, connected to a ¾ x 8-inch steel cord at the top. It costs about $8000 to reinforce a ship.



Steel Knees Are Popular

THE illustration above shows a form of cast-steel knees very popular with wooden shipbuilders on the Pacific coast. These knees are about 4 feet on a side, the metal being approximately ¾-inch thick. They are placed under the ends of deck beams thus adding to the rigidity of the hull structure. The steel foundries on the Pacific coast have built up an attractive business manufacturing these knees. The photograph at the left shows how air hammers are used to drive drift bolts through keelson timbers on the inside of the vessel. These bolts, which are 1⅛ inches in diameter, usually are made of wrought iron rolled from scrap material.

Pulverized Coal for Air Furnaces

While Still in the Experimental Stage, the Use of Pulverized Coal in Air Furnaces Gives Promise of Uniform Firing and Many Other Desirable Features —Recent Tests Are Encouraging

BY W. R. BEAN

THE need for some improved method of firing air furnaces used in melting malleable iron which will be less laborious and more dependable than the present method of hand firing will be readily acknowledged by many who have had experience in this direction. While more is known today than in past years regarding the way in which hand firing of the malleable melting furnace should be done, it is questionable if there has been any decided improvement in the results obtained, due to the class of labor on which it is necessary to depend for work of this character.

Aside from the limited use of the open-hearth furnace in melting malleable iron; a very small number of furnaces fired with oil or natural gas; and the recent application of the electric furnace as a unit in the melting and refining process; the use of which, however, will no doubt be confined for some time to come largely to new foundry plants, we are dependent upon gas coal as the fuel for melting malleable iron, the firing of which may be accomplished by hand, by mechanical stoker and by introducing coal in pulverized form.

Hand Firing Cannot Be Uniform

The essential factor in the burning of any fuel is the proper proportioning of air to the combustible available for burning at a given time. It is obvious that with hand firing there can be no uniformity in this essential feature because the amount and size of the combustible available is constantly varying. When coal is thrown on a hot fire bed, the volatile products are rapidly driven off with the result that there is not sufficient oxygen present for complete combustion, the supply of air being constant, or if there is sufficient for this condition there must of necessity be an excess as the coal burns down between firing periods.

The mechanical stoker has been tried out on the air furnace many times, but in only a few instances has the equipment installed remained in service for any considerable period. At present I do not know of any air furnaces, melting malleable iron, which are being fired with a modern type mechanical stoker, although in one plant there are several furnaces used for melting cast iron for special purposes, which are being successfully fired with mechanical stokers of the underfeed type.

The figures on pulverized coal firing, included in the accompanying table, cover a number of heats melted with pulverized coal in a furnace at the Deering works of the International Harvester Co., Chicago. Thirty-six heats in all were taken, as will be seen by reference to the tabulated results. These were not sufficient to determine either the practicability or impracticability of the method, but the results obtained appeal to me as having sufficient merit to justify some progressive organization in carrying the matter further, especially in plants where pulverized coal is now being used for annealing purposes.

Fundamental to success in the operation is the kind of fuel used and this cannot be very different than that which it has been found necessary to use for best results in hand firing. Coal high in volatile combustible matter—30 per cent or over—is very desirable and the ash content should be below 10 per cent and the sulphur below 1.5 per cent. However, slack coal from the screened coal generally used for hand firing air furnaces can be satisfactorily employed, the principal objection being the higher ash and sulphur content.

Just how detrimental the deposit of ash over the charge before melting down and over the bath after melting will be, is a question that is yet to be determined. With a suitable combustion chamber and burner this probably would not cause serious trouble. However, there is a considerable total quantity in the fuel to be cared for. For example, in a 20-ton heat, assuming 800 pounds of coal per ton of iron and 10 per cent ash, there would be 1600 pounds of ash to dispose of and it is a matter of importance as to where this is deposited. Obviously it is advantageous to deposit it as much as possible in the combustion chamber and with a view to readily disposing of this deposit, one company in the pulverized coal equipment business has developed a combination of low-pressure feeder, burner and combustion chamber, whereby the majority of the noncombustible is precipitated before the heating zone of the furnace is reached. The point of deposit of ash is dependent upon a number of factors among which are fineness of coal, point and completion of combustion, and velocity resulting from draft or pressure.

There is one point of importance in which the coal may to advantage be different from that used for hand firing, namely, that coal in which the fusing point of the ash is low has certain advantages over coal in which the ash has a high fusing point. Ash with a low fusing point will deposit earlier as slag. This is particularly advantageous for plants located in the west or middle west, where the coal available at lowest cost generally has ash of a low fusing point, although otherwise suitable for melting furnace firing by hand. In the matter of sulphur content of coal I have been unable to find any difference in the effect of this element on the metal between one method of firing and another, since it volatilizes in any case and passes over the bath with the products of cumbustion.

The Degree of Pulverizing

For quick combustion and high temperature, coal should be pulverized to a fineness of not less than 85 per cent of the total through 200 mesh and 95 per cent of the total through 100 mesh. Some operators found it advisable in open-hearth practice to pulverize to an even higher degree of fineness. The advantage to be gained from this will be found to exist equally with the air furnace and the open-hearth furnace, since high temperature is the end sought in both cases. Coal for pulverizing must be thoroughly dry, 1 per cent or under in moisture and preferably as low as 0.50 per cent. This is necessary not alone for the proper mixing and burning of the fuel, but from the standpoint of cost of pulverizing. The cost of pulverizing is a variable factor in which many different elements, particularly the cost of power, are involved and can only be stated definitely under known conditions. Some

The author of this paper, which was presented at the Boston meeting of the American Foundrymen's Association, is metallurgist, Naugatuck Malleable Iron Works, Naugatuck, Conn.

large plants are pulverizing at a cost of approximately 25 cents per ton.

The furnace on which the experiments were conducted was of good general design with stack of ample proportion. In making the change from hand firing to pulverized coal firing only minor alterations were required. The fire-box was converted to a combustion chamber by increasing the length to give sufficient travel of the coal and air mixture to get good ignition before impingement of the flame against bridge wall, which was allowed to remain as in hand-fired practice. The grates were covered over with about 6 inches of cinders to form a hearth for deposit of the slag from the ash in the fuel. The length of the melting chamber from bridge wall to bridge wall was 24¾ feet, and the furnace was 7 feet wide at the front. The side walls were parallel for 11 feet back of the front bridge wall, from which point the furnace narrowed to 5½ feet at the rear flue or neck, the opening through which was approximately 420 square inches in area. The area of stack inside of lining was 1385 square inches.

Pulverized coal fires, with coal of proper dryness, fineness and volatile content, are very readily started, it only being necessary to light a small quantity of oily waste in front of a burner and start the coal and air feeds. With any reasonable amount of care, there need be no smoke or coke formed where there is sufficient flame-way in starting up a malleable melting furnace and, of course, there is none after the furnace and charge become hot. To prevent smoke and coke in starting, it is necessary to burn with a short flame and get complete combustion in the front of the furnace.

It will be well to have clearly in mind the distinction between a pulverized coal burner and a pulverized coal feeder or controller. The function of the latter is to supply uniformly to the burner the quantity of coal which it may be desirable or necessary to burn to produce the required temperature. The mixture of coal and air takes place in the burner, combustion beginning soon after this mixture enters the combustion chamber, the exact point at which this takes place being dependent upon velocity, air proportion and other factors.

Tabulated Results of Tests

Turning now to the figures in the table at the end of this paper we find results, in coal consumption per ton of iron, melting time and silicon loss, all the way from poor to exceptionally good, the latter applying particularly to heats Nos. 34 and 35. There are 12 different furnace arrangements indicated under the heading, "Furnace Arrangement". In some cases the change between one arrangement and another was only slight, yet it was considered of sufficient importance to record; in other cases the change was a radical one.

Arrangement Producing Best Results

Furnace arrangement No. 11 produced the best results, the figures for heats Nos. 34 and 35 comparing favorably with the very best practice under band firing methods. The change from arrangement No. 10 to arrangement No. 11 did not in any way involve the coal feeding or burning equipment, but was one of furnace construction. It consisted of lowering the roof of the furnace so as to bring the nozzle outlet of the top blast into the proper relation with the bath and directing this in such a way as would bring the point of highest temperature in direct contact with the metal and in providing sufficient volume of air through the top blast.

In judging the coal consumption figures it should be remembered that many of the heats were single heats only, taken after the furnace had been idle for days or for weeks and that a large amount of fuel was required to bring the furnace up to the temperature that would exist in a furnace in regular operation for one or two heats a day.

The period which is of greatest interest because of the more nearly continuous operation is that from July 15 to 31, inclusive, with furnace arrangement Nos. 10 and 11, heats 20 to 35, inclusive. During this period we tried to get the proper proportion of air and fuel and in this we were only partly successful because arrangement could not be made to continue the test for a period sufficiently long to work the matter out to a final conclusion. There was, during this time, a fairly regular decrease in coal per ton of iron melted, in time per ton melted, and in silicon loss from oxidation during the heat. The relation between coal per ton and silicon loss is of particular interest. In looking over these figures in light of more recent experience, it is evident that the high coal consumption was largely the result of excess air, although there was not much difference in the operation under furnace arrangement Nos. 10 and 11.

Heats Nos. 1 to 35, inclusive, were taken with all of the air for combustion supplied under pressure. Heat No. 36 was taken with something more than half the air taken in by induction, only the top blast and the air necessary to convey the coal into the burner being supplied under pressure. Not much can be based on the results of a single heat, but from what has been accomplished in locomotive and stationary boiler firing under the induced draft system, I consider this method for air furnace operation one well worth considering.

The use of pulverized coal on the air furnace brings to my mind two other matters which may be well worthy of serious consideration. Waste heat boilers may be more generally employed because the method of firing lends itself readily to the maintenance of a low fire between heats to maintain the boiler capacity required in the majority of malleable foundries during the off hours of operation. Furthermore where the steam supply is lacking, combinations of waste heat and direct firing are now being installed to provide a 150 to 200 per cent of nominal horsepower rating output, which is most advantageous in plants where power is required, for other than foundry operation. There are, no doubt, some and perhaps many localities in which an agreement for exchange of power with local power distributors could be effected which would result in a material saving as compared with the present cost of air furnace melting and power supply. The other point which presents itself is the possibility of using silica brick in furnace lining, the ability to keep a furnace hot continuously making the use of this kind of brick practical.

One of the achievements credited to the late David H. Browne, chief metallurgist of the International Nickel Co., is the practical application of pulverized coal firing to reverberatory smelting furnaces. I know that there are several installations in successful operation in the copper and zinc refineries and it would seem that the advantages to be gained in the malleable industry should be fully as great.

Conclusion

The probable or at least possible advantages to be derived from pulverized coal firing of the air furnace may be summed up as follows:

The elimination of the exhausting labor of hand firing, permitting the employment of more intelligent men in operating the furnace.

The elimination of the clinker problem which at this time is unusually serious owing to conditions existing in the coal market.

A reduction in the cost of fuel over present hand-fired practice by improved combustion, and in some cases by the use of lower-priced fuel.

The elimination of smoke.

A more advantageous use of waste-heat boilers.

A reduction in cost of furnace maintenance by the use of silica brick.

Navy Accepts Large Floating Crane

American Equipment for Government Service Now the Order of the Day—New Crane a Refreshing Contrast to German Failure Furnished Panama Canal—All Tests Successfully Passed

AMERICAN manufacturers are making great strides in the engineering world and with such marvelous results that one wonders when the limit will be reached. Certainly not yet, for there has just been completed a 150-ton floating crane, massive in construction and worthy of the inscription, "Made in America." This crane, said to be one of the largest ever constructed in this country, was built by the Wellman-Seaver-Morgan Co., Cleveland, and was turned over to the navy department to be used at Norfolk navy yard, Norfolk, Va.

The Wellman-Seaver-Morgan Co. has built three other floating cranes for the navy, but none as large as this. The cranes previously built are of the bridge type; when operating, the whole crane including the pontoon is maneuvered to bring the hoisting cables to the proper position for lifting. The new crane is of the revolving type, its principle being similar to that of the ordinary revolving derrick. The jib is rotated until it comes opposite the work to be lifted and is then lowered until the hooks are in the proper position. The hooks are operated by steel cables passing over sheaves built into the end of the jib.

To give a more concrete idea of the size and capacity of this apparatus, it may be said that its full-load capacity is equivalent to the weight of 100 of the largest touring cars. The crane would readily lift an ordinary switching locomotive. The empty lifting hooks themselves weigh about two tons, or the equivalent of the weight of a large touring car. When raised to its maximum height, the top of the jib is over 200 feet above the water level. It also must be remembered that the whole structure is mounted on a floating pontoon, the stability of which must not be endangered by handling immense loads.

Careful engineering calculations were required to proportion the parts of this crane so that as the pontoon is careened sidewise and endwise under loads, it is still stable and protected against capsizing.

The pontoon contains a complete boiler plant, and an engine-driven generator which supplies the electric current for operating the various motions of the crane which are controlled from a small cab mounted high above the deck. One operator, by means of a few levers and master controllers is able to control all the functions of the crane with the utmost delicacy.

Regenerative braking is employed in such a way that the speed of lowering can be controlled with great nicety. In case of an accidental interruption of the

Our Honor Redeemed

Treaties are not the only scraps of paper in German eyes; United States government crane specifications are in the same category, as readers of The Iron Trade Review, familiar with the shameful history of the floating cranes for the Panama canal will readily recall. It is refreshing, therefore, to be able to present this article describing an honestly built American crane for an American navy yard, as a sequel to the "Details of a National Disgrace," published in our issue of Feb. 4, 1915. The German cranes, like German character, failed to stand-up to the test; the new American cranes met all the requirements of the navy specifications. Our national honor is being redeemed through more than bloodshed.

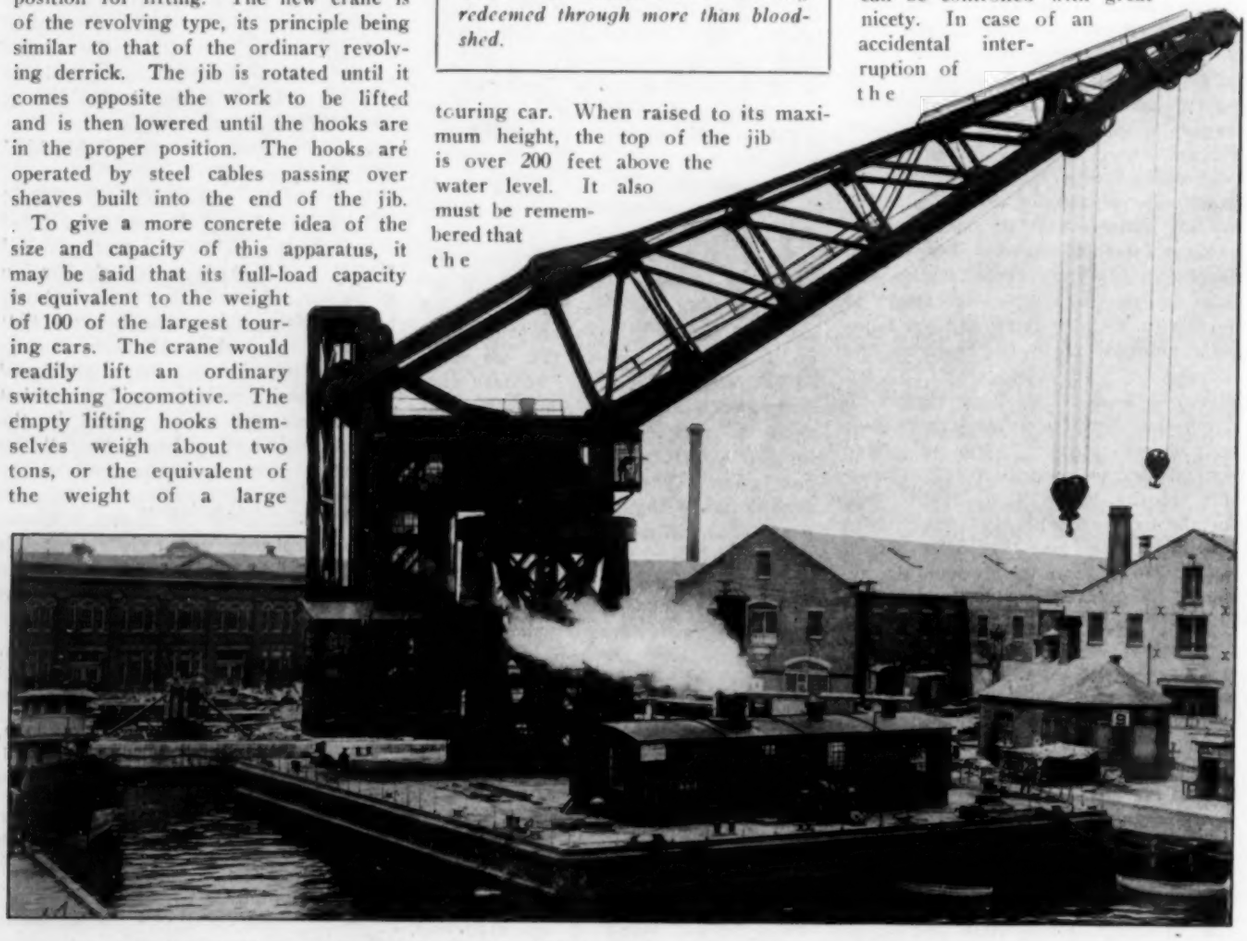


FIG. 1—SIDE VIEW OF 150-TON FLOATING CRANE SHOWING PONTOON, CAPSTANS, STEAM POWERHOUSE AND TURNTABLE

electric current, all of the motions of the crane are automatically locked by means of magnetic brakes so it is impossible to drop the load from such a cause. Great safety and accuracy of control are essential as the crane is used to handle large guns and turrets on battleships, as well as other expensive machinery and equipment.

The boom is of the cantilever type. The main pivotal or step bearing supports a ball or universal joint that carries a maximum load of 2,021,000 pounds. The counterweight at the rear end of the jib weighs approximately 600,000 pounds and moves vertically in guideways. The boom supports one 2-sheave auxiliary and two 4-sheave main hoists. The latter are parallel and are operated either separately or simultaneously by two 60-horsepower motors. Each main hook has a lifting capacity of 75 tons and when the two are operated together, a crossbeam supporting a central hook may be attached. The average speed under the maximum load of 200 tons is about 6 feet per minute. The auxiliary hoist has a capacity of 25 tons and a speed of 30 feet per minute. Two 60-horsepower motors are provided for the auxiliaries, one for hoisting and the other for operating the carriage up and down the boom.

The boom can be luffed from 30 degrees above horizontal to a vertical position in about 12 minutes. The luffing is accomplished by means of two 10-inch screws driven by two 60-horsepower motors. The boom, driven by two 60-horsepower motors, makes one complete revolution in four minutes. The crane is mounted on a steel pontoon 140 x 85 x 15 feet as shown in Fig. 1. The total displacement of the boat and its equipment is 2232 tons. As previously mentioned, a complete boiler plant located on one end of the barge, supplies the steam used in operating the anchor hoists at both ends of the boat and the 150-kilowatt generator. There are four capstans, one at each corner, all driven electrically.

The motors used in operating the crane are housed in a 5-story structure which is supported from the rear of the bridge and with the equipment acts as a secondary counterweight for the boom. The operator's pulpit is enclosed with glass on the front and sides and houses all crane controlling levers. This house is located at the left of the lower swivel joint of the boom and commands an excellent view of both hoists at all times.

The crane was accepted by the navy department after it successfully hoisted 180 gross tons at a radius of 105 feet from the crane center to the load, as illustrated in Fig. 2. About the first duty the crane performed for the government was to raise the tug MASSASOIT after she had been accidentally sunk.

According to a report issued by the United States vice consul at Frankfort-on-Main, the first substitute for a cycle rubber tire to appear in Germany was a tire made of steel wire about 3/16 inch thick, wound into a very close coil, the two ends being welded together to give it the proper shape. These tires are sold at $2.85 wholesale and retail at $4.28. Wire is said to be a poor substitute as it cuts into the pavement and rattles considerably. Wood and rope tires have also been used with varying degrees of success.

Co-operative Course

The Massachusetts Institute of Technology, Cambridge, Mass., has established a new course in co-operation with the Lynn, Mass., branch of the General Electric Co. The object of the course is the training of leaders for engineering and administrative branches of electrical and related industries. It affords a distinctive training for technical and executive responsibilities with manufacturing corporation, particularly electrical ones. The course covers a period of three years. The requirements for entrance are the completion of work equivalent to the first two years of the electrical engineering course at Massachusetts Institute. While working in Lynn, the co-operative students receive compensation as regular employes. The last year of the course is given up to special research problems at the works and advanced instruction in the courses leading to a master's degree at the institute. The number of men who may be admitted to this co-operative training each year is at present limited, and candidates for admission are subject to the approval of both the Institute and the General Electric Co.

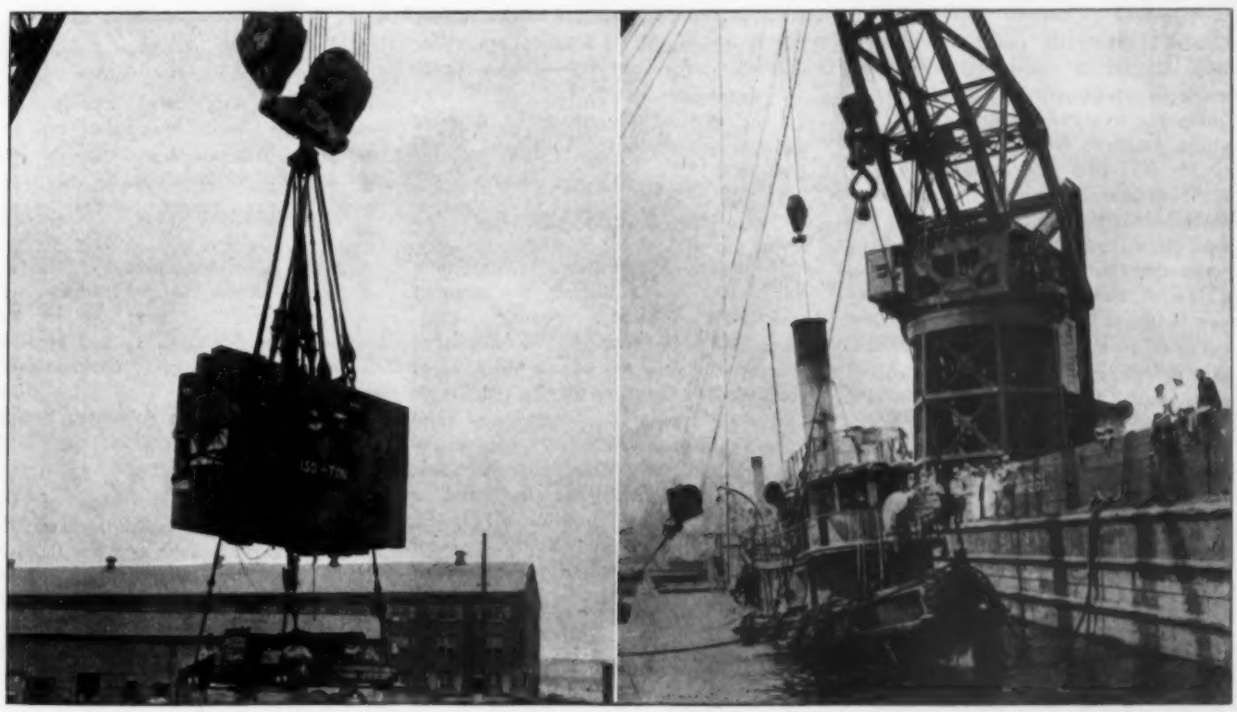


FIG. 2—LEFT TO RIGHT, VIEW OF CRANE LIFTING 403,200 POUNDS AND RAISING THE NAVY TUG MASSASOIT

Fifth Advance

For Common Iron and Steel Labor in Twenty Months Announced

Advances of 10 per cent in the wages of common laborers in the iron and steel industry effective Oct. 1, generally are being adopted following the announcement Sept. 20 of Chairman E. H. Gary that the Steel Corporation would grant such an increase. Independent iron and steel companies generally are taking action similar to that of the Steel Corporation. The latest advance will represent the fifth of a similar amount in 20 months. After Oct. 1 the rate for common laborers in the Youngstown district will be 33 cents per hour compared with 19.5 cents per hour prior to the initial advance in January 1916.

Picketing by Strikers Assailed by Court

Picketing of a place of business by strikers as a means to interfere with the normal operations of the establishment is held to be an infraction of legal rights in the decision recently returned by the supreme court of the state of Washington in the case of St. Germain against the Bakers and Confectionery Workers Union No. 9 of Seattle. "The idea upon which picketing cannot by any means be sustained is that it intimidates the public from entering into the place and doing business with the person before whose store or place of business a line of guards is stationed," says the court. "Where a line of guards consisting of one or more is stationed before a place of business, everyone knows that such guard is there for the purpose of intimidating and preventing the public from dealing with the person whose place of business is picketed. That this is contrary to the spirit of our institutions and the right to conduct a lawful business in a lawful manner without molestation from other persons needs no argument to sustain it."

Holds Bonus is Wage

The Pennsylvania compensation board has ruled that a bonus is to be considered a part of a man's wages and not as a gift or gratuity in computing compensation awards. The board holds in the case under review that the bonus paid was an inducement for men to remain at work and that it was general in its application and not confined to any one kind of labor. In the case decided the deceased was an employe of a powder company and the board says that the bonus was to obtain and hold men and "was as much a part of the wages and contract of hiring as if expressly incorporated into writing".

The Pennsylvania state industrial board is about to issue for criticism copies of the proposed safety code to govern scaffolding in buildings and in industrial plants. It will be a companion code to that governing ladders, cranes and similar matters.

German Unions Dwindle

The war has wrought many and great changes in the conditions of German labor, changes which will no doubt make themselves felt long after the restoration of peace. Figures recently published in *Engineering* illustrate the manner in which the war has reduced the ranks of the trade unions. The Metal Workers' union, before the war, boasted considerably more than 500,000 members, but after a year and a half of conflict the number had receded to about 234,000. The reduction in the final aggregate is accounted for by the calls to the colors which, in 1914, amounted to about 185,000 members, and during the next year to 117,000. A large number of members, about 80,000, left the union for other causes during 1915, but this was more than made up by the entrance of new members, of which, however, some 19,000 were women. The Building Trades union has had a still greater loss in its numbers, and has probably suffered more than any other. In 1914 the members of this union were about 236,000, belonging to 888 local branches; in 1915 the average figures had receded to respectively 101,000 and 847, and by the end of the year the number had further dwindled to about 83,000 members.

Urges Food Saving

In order to stimulate its workmen to greater thrift during the present crisis, the Whiting Foundry Equipment Co., Harvey, Ill., has posted throughout its works a number of placards in the shape of United States banners showing the necessity of food conservation. Workmen are urged "to eat one wheatless meal per day, two meatless meals per day" and to economize in the use of all foods, especially butter and sugar. Other placards urge workmen to save their money to invest in the second issue of the Liberty loan.

The Syracuse Smelting Works, Brooklyn, N. Y., has completed the installation of two additional furnaces.

Obituaries

ELWOOD B. BLANDY, well-known pig iron salesman in the east, died in New York, Sept. 16, after an illness of a few days with pneumonia. Mr. Blandy was born 63 years ago in Zanesville, O., where his father operated a plant which was the first to manufacture steam locomotives west of the Alleghenies. For a few years after completing his education he worked for his father, but soon became identified with the pig iron business. For years he was eastern representative of Geo. H. Hull & Co., at Baltimore, and in this connection was the first to introduce the famous de Bardeleben iron in the east. Later he represented M. A. Hanna & Co., at Buffalo, and for a time was connected with B. Nicoll & Co. For several years Mr. Blandy was general sales agent of the Tennessee Coal, Iron & Railroad Co., and after the taking over of this interest by the United States Steel Corp., he was in the New York office of the Carnegie Steel Co. Seven years ago he became New York representative of Pilling & Crane, which connection he resigned Sept. 1, to become secretary of the Northern Ore Co., which recently acquired the Keystone furnace at Island Park, eastern Pennsylvania.

Edward M. Whyler, inventor of the overhead sprinkler system for fire protection, died Sept. 14 at Harvey, Ill. He was born at Norwalk, O., in 1834, and removed to Chicago in 1893.

Joshua S. Wheeler, one of the pioneer toolmakers of Worcester, Mass., died in that city, Sept. 15, aged 88 years. He established the firm of Joshua S. Wheeler & Co., machinists, half a century ago which he continued until his retirement several years ago.

George S. Rider, president of the George S. Rider Co., Cleveland, engineer, died suddenly Sept. 11. He was born in Providence, R. I., and came to Cleveland 25 years ago to open an office as a consulting engineer. Mr. Rider was a member of the American Society of Mechanical Engineers and the Cleveland Engineering society.

Rodolphus C. Waterman, of the R. C. Waterman Co., South Hanover, Mass., maker of tacks and small nails, died at his home in Hanover, Mass., Sept. 14, aged 77 years. At the close of the Civil war, in which he saw service in a Massachusetts regiment, he joined his father, Lemuel C. Waterman in the tack business, which grew to large proportions.

Business Pledges Whole Support

In Great War Convention at Atlantic City Leaders of Industry Take Measures to Dispel Confusion Surrounding Co-operation With Government—General Price Fixing and Arbitration Board for Labor Diputes Approved

A Declaration of the War Convention of American Business

THE people of the United States, in defense of the Republic and the principles upon which this nation was founded, are now taking their part in the world war with no lust for power and no thought of financial or territorial gain.

The issues at stake in this tremendous struggle involve the moral ideals and conception of justice and liberty for which our forefathers fought, the protection of the innocent and helpless, the sanctity of womanhood and home, freedom of opportunity for all men and the assurance of the safety of civilization and progress to all nations great and small.

Speed of production and the mobilization of all our national power mean the saving of human life, an earlier ending of the designs of autocracy and militarism and the return to the peoples of the earth of peace and happiness.

Undismayed at the prospect of great taxes, facing the consumption of its accumulated savings, American business without hesitation pledges our government its full and unqualified support in the prosecution of the war until Prussianism is utterly destroyed.

Assembled on the call of the Chamber of Commerce of the United States and representing more than half a million business men and every industry in every state in the Union, this convention promises to our people that business will do all in its power to prevent waste of men and material and will dedicate to the nation every facility it has developed and every financial resource it commands on such terms and under such circumstances as our government shall determine to be just.

PRICE-FIXING on essential products, not only to the government, but also to the public, and their distribution in a manner to promote the national defense, was heartily endorsed by the war convention of the chamber of commerce of the United States, in session at Atlantic City, Sept. 17 to 21. To eliminate the confusion that exists in Washington at present in the purchase of war supplies, it was recommended that all buying should be assembled under the control of one board.

At several of the meetings, delegates introduced resolutions urging the simultaneous fixing of the wages of labor of any commodity upon which the government would establish a price. Every reference to the control of the cost of labor was heartily applauded and it was apparent that it was the unanimous sentiment of those in attendance that a resolution covering this subject should be reported by the committee. However, the delegates were not afforded the opportunity to record their votes on this proposition, although recommendations for the curbing of the demands of labor are contained in the resolution providing for the establishment of an arbitration board and the endorsement of the principle proclaimed by the committee on labor of the council of national defense "and so eloquently restated before this convention by the secretary of labor".

The arbitration board is to be constituted equally of representatives of employers, employes and the government, to which shall be referred all major disputes during the conduct of the war and during the adjustment of such disputes there shall be no interruption of production by lockout, strike or other causes and the decision of the board shall be accepted as binding by both parties.

The principle proclaimed by the committee on labor of the council of national defense and restated before the convention by the secretary of labor, was endorsed by the chamber as the necessary basis for maximum production while the country is at war. The principle referred to, follows: "That during the present emergency, employers and employes in private industries should not attempt to change the standards which they were unable to change under normal conditions."

Capital and Labor Must Sacrifice

In his address before the chamber and referring to the problems that have come before the department of labor, Secretary Wilson spoke as follows:

"In the department we have not sought to impose any views on either side, employer or employe. In these labor difficulties we have tried to find some ground acceptable to both sides, but it occurs to us that employers and employes should both be willing to yield something for peace, that both should make sacrifices, in order to keep our industries moving smoothly. I have said to employes this is no time to insist on the recognition of your union, no time to insist on the changes of standards in work. I have said to employes if they have been unable to gain recognition of unions in normal times, they should not endanger their country's future by insisting on these changes in these abnormal times."

One resolution which met with the hearty and unanimous support of all of the delegates dealt with the revision of fixed prices. It states that all such prices, of necessity, should be based on cost of production, and since the cost of the various elements entering into this, including raw materials, labor, transportation, etc., may vary from time to time, opportunity should be afforded by the board's fixing such prices to present changes in producing costs in order that the proper relation between cost and fixed price be maintained.

A strong stand also was taken against profiteering, as follows: "That during the war it is essential to the maintenance of sound industrial relations that there be no profiteering by producer, distributor, laborer or manufacturer."

To establish a point of contact between the government and each particular industry, it was recommended that all industries not already organized become so at the earliest possible moment, and that all such industrial organizations appoint a war service committee to consist of representative men in the industry, whether or not they be members of such organization. In all matters pertaining to any given industry the government should deal with the committee wherever possible, leaving to it, wherever practicable, the proper distribution of all orders for material.

Before adjournment, congress was urged to enact legislation giving the President power to suspend the present provisions of the law governing coastwise shipping and to permit vessels of foreign registry and foreign-built vessels admitted to registry under the act of Aug, 18, 1914, to engage in the coastwise trade during the present war emergency. Representatives of the Seattle chamber of commerce demanded that an exception be made of vessels in the Alaskan trade on account of the fierce competition of Canadian steamship lines. It was stated that the committee of the house of representatives that has been conducting hearings on this subject had decided to make an exception of the Alaskan trade in its report to the house. A rising vote was taken on this amendment which was lost and the original resolution was adopted.

Express Confidence in Russia

Other resolutions adopted, follow:

Message of sympathy and support to the Russian government and to the people of Russia and an expression of confidence that they will carry through to permanent victory the triumphs of the revolutions and, in co-operation with their allies, make safer democratic ideals throughout the world for the present and future generations.

The United States government should taken action to keep at parity the American dollar in every country in the world. Owing to the tremendous balance of trade in favor of the United States due to an excess of exports over imports and heavy loans to our allies the American dollar in foreign markets is now at a discount of 3 to 20 per cent.

The adoption of the daylight-saving plan to conserve the nation's supply of coal and to add to the productiveness of the manufacturing plants. The passage of the Calder bill by the house was urged as a war measure.

Co-operation of business men in promoting the sale of Liberty bonds.

Improvement of public highways to facilitate the movement of materials.

Position favoring universal military training was reaffirmed.

The passage of the Webb-Pomerene bill is urged to foster and promote export trade.

Naturalization of resident aliens was urged in order that they may assume a position of equality with our citizens for the defense of the United States.

The appointment of a foreign commission by the chamber of commerce of the United States, to study and report upon the means whereby the country may best adapt itself to the problems that will arise during and after the war.

That war taxes, when above a certain amount, be payable in four quarterly installments.

For action by the board of directors were referred labor conditions after the war; water power legislation, co-operation with state military authorities and foreign trade relations.

La Follette Ouster Withdrawn

At the conclusion of the presentation of the resolutions, Joseph G. Butler Jr., Youngstown, O., asked what had become of the resolution offered by a member of the chamber of commerce of Green Bay, Wis., and passed by this body, demanding the impeachment of Senator La Follette. He was advised that it had been withdrawn. Mr. Butler then stated that no more important resolution had been introduced than this and his recommendation that La Follette be sent to Germany by the President was greeted with tumultuous applause. Mr. Butler said that the same action should have been taken with Senator La Follette as was meted out to Vallandigham during the Civil war, who was sent to the confederacy by President Lincoln.

In every respect, this war convention of American business and industry was the most successful undertaking to sound the sentiment of manufacturers, jobbers and dealers, that has been attempted since the war began. The attendance approximated 2000, and the interest manifested in the addresses and discussion indicated the whole-hearted support of the business of this country for the government in this great crisis. It was suggested that all local chambers of commerce hold similar war conventions prior to Nov. 1.

Following the close of the last session, an informal gathering of large steel consumers was called for the purpose of considering the appointment of a committee to call upon the proper authorities at Washington and urge the fixing of the price of steel to the user as well as to the government. After considerable discussion it was decided that this recommendation be made individually by each manufacturer to Senator Pomerene and others fostering the legislation.

War as a Great Economic Struggle

A gigantic economic contest, with the preponderance of potential strength on the side of the allies, but offset to some extent by the superior organization and co-ordination of Germany, was the picture of the present war drawn by James A. Farrell, president of the United States Steel Corp., and chairman of the National Foreign Trade council. Because of the character into which the struggle has resolved itself, "the imperative obligation rests on American business to contribute its intelligence, its energy and its tenacity, whole-heartedly and unselfishly, to the problem of how all the resources at joint command can best be employed in the service of the war," said Mr. Farrell.

Of all the contributions which this country may make to the prosecution

of the war, that of ships must be first in the opinion of the speaker, because only by means of them can these contributions be delivered. "Here is a new, enormous and imperative demand for steel that must be met," said Mr. Farrell. "It is a demand which requires a readjustment of the steel business of the nation. Production must be stimulated, as millions of tons will be required for military necessities and for the naval and emergency fleet program." The building of the vast fleet of shipping calls for the co-operation and support of every department of American industry."

Neutral Trade Presents Problem

"The share of American business in winning the war will not be determined merely by the use we make of material of native origin; we must make sure of a continued supply of indispensable supplies from other countries," said Mr. Farrell. He spoke of the nitrates from Chili, the tin from Malay Peninsula and Bolivia, manganese ore from Brazil, wool from Argentine, cocoa from Equador and Central America, rubber from Brazil and Ceylon, and other essential materials. He referred to the clear recognition in Great Britain from the outset of the war of the necessity of maintaining foreign trade at the highest possible standard, not only as a means of insuring the absolutely imperative supplies for the British army and the British people, but also as a not less important means of maintaining British finance and credit. "Thus the problem of our government is twofold: How to maintain trade with our allies and with neutrals, particularly non-European neutrals, as a means to the winning of the war; and how to restrict commerce that might be a possible direct or indirect benefit to the enemy. While the supply of the needs of our allies and of our own expeditionary force is, of course, the first necessity, it will be a mistake to regard this as entirely a part inseparable from the maintenance of our neutral commerce, especially to that with Latin-America and Asia," he said. He declared the exports administrative board has a great opportunity at present to foster trade with Latin-America. Practical Pan-Americanism may be realized by steadfast recognition in principle and practice of the economic ties between the United States and other American republics. He stressed the importance of this country continuing to offer a market for a considerable part of the product of Latin-America and to provide adequate transportation for the conveyance of this merchandise.

How the orders of the government for 34,000 wagons were filled by the manufacturers, was told by Chairman Butterworth of the war industries committee of the National Implement and Vehicle association. The wagon parts first were standardized by the engineers. When it came to obtaining the wood for the construction, it was found from a survey of the lumber trade that only sufficient seasoned material for 10,000 wagons was available. This was purchased without unduly advancing prices by three experienced lumber dealers. Having worked out largely the original difficulties, a meeting of the association of manufacturers was called and the entire order for the wagons was allotted in a short space of time.

Lazard Kahn, of the Estate Stove Co., Hamilton, O., spoke of the manner in which the stove manufacturers have been serving the government. A committee of stovemakers consulted with the government on the heating of army cantonments and developed an efficient cook stove for camp purposes. This enabled the heavy demands of the government to be met promptly.

Wants Coastwise Laws Suspended

Discussing the subject of how American business can help promote transportation, Raymond B. Stevens of the federal shipping board urged support of the board's request that the laws barring foreign ships from coastwise trade be suspended during the war. He said that if this was done, thousands of tons of neutral shipping now tied up at docks afraid to venture into the danger zone would be made available for coastwise trade. As a result, American ships so engaged can be released for overseas traffic and for army and navy use. The pinch in shipping is likely to come in the next six or eight months, he said. Mr. Stevens stated that the shipping board is against recommending any change or repeal of the seaman's act.

Harry A. Wheeler of Chicago, former president of the chamber, expressed the opinion that federal control of railroads will be brought 10 years nearer by the war. He believed that federal incorporation and federal regulation of the issuance of securities would be the next step taken. He feared that the great demands for capital for war purposes would greatly interfere with the railroads obtaining capital for development. "The government must render assistance to the railroads in obtaining capital, as it goes on tightening and increasing its regulations," he said.

A. C. Bedford, president of the Standard Oil Co., and chairman of the petroleum committee of the council of national defense, estimated that 55,000,000 barrels of gasoline will be required for public use next year. This amount can be made from the crude oil now being produced. He urged economy by automobile owners and declared it was absolutely necessary that more wells be drilled to increase the crude supply for the refining of gasoline.

Walter Parker, assistant to Secretary of Commerce Redfield, and in charge of inland water transportation, spoke on the necessity of the country augmenting and better systematizing its transportation facilities to maintain its domestic and foreign trade. "This means," he said, "that the inland navigable waterways can be used as an adjunct to the railroads and in co-ordination with the latter." He said that today the normal volume of commerce requiring movement in the United States is greater than is the provision for moving it. This means the day of railroad monopoly of railroad transportation now is forced to an end. The federal government realizes the necessity for the readjustment of the transportation system. The national council for defense is vigorously promoting the use of the waterways as a means of relieving the war strain of the railroads. The breaking-down of the old railroad rate-making system which gave the river towns preferential rates, has begun. "Various ports now are building river, rail and ocean terminals and warehouse facilities, and river towns also are building or preparing to build river-rail terminals and waterside storage facilities, all of which," said Mr. Parker, "point to a much more important part in commerce which inland waterways will fill in the future. Samuel L. Hastings, president of the Illinois Manufacturers' association, pleaded for the co-operation of business in improving transportation facilities.

Export Control Considered

Export control by means of government license from the standpoint of the exporter, was discussed by Edward S. Huxley, president of the United States Rubber Export Co., Ltd. He covered the ground upon which governmental control of exports under present conditions fully is warranted. This being so, he said the burden for the wise and proper administration of this control squarely was placed upon the government. He called attention to various essentials which he believed the government should observe in carrying out its regulation of foreign trade. These are as follows:

First.—Do not interfere any more than is necessary with our export trade, but, on the other hand, encourage it by every means possible, bear-

ing in mind that if we withhold our exports from neutral countries they will probably withhold their exports from us.

Second. — Encourage our export trade especially so that trade balances may be in our favor and so that our gold reserve may be maintained and increased.

Third.—In executing the policies of control established, act upon applications for licenses expeditiously; issue the license to be good until used but revocable at will. Do not duplicate the work being done by other governments, but secure from them a relaxation of their control before establishing a like control to accomplish the same object. Declare your policy, in so far as possible, in order to prevent the application for license where there is no possibility of its issue.

Fourth.—Retain by means of prohibition an adequate supply for your own use and that of the people.

Fifth.—Prevent by all means any aid or comfort to the enemy, and last, but by no means least, conserve to the best use all available ocean-going ships.

Urges War Organization

Walter S. Gifford, director of the council of national defense, recommended that associations be formed along democratic lines by the manufacturers in every industry and that committees be appointed to represent these industries in meeting the government's war needs. "To mobilize industry in time of war," he said, "industry first must mobilize so that it can serve the government. The business man must get away from provincialism and organize business more than it ever has been organized." He declared regulation of public utilities in such products as coal, iron, copper, etc., is necessary to prevent abuse. George D. McIlvaine, secretary of the national trade organization secretaries, spoke in favor of the appointment of war service committees by every trade organization in the country.

Must Ward Off Depression

Unless American manufacturers make every effort to establish and foster export business in manufactured articles, a disastrous trade depression at the close of the war cannot be avoided, according to John D. Ryan, president of the Anaconda Copper Co. Mr. Ryan uttered this warning in discussing "Foreign Trade in Winning the War". In support of his statement, the speaker cited the preponderance of raw material over manufactured products in export shipments. In 1913 raw material made up 68 per cent of foreign shipments and manufactured products only 32 per cent. Unless all efforts shall be made to swell the proportion of manufactured products the country at the conclusion of peace will be in the same position practically as before the war, he said. Much manufacturing capacity now producing munitions and war supplies will be rendered idle when hostility terminates, said Mr. Ryan, because domestic demands are so far below producing capacity. Furthermore, the position of the American manufacturing industry in general is less favorable since this country entered the war, because no more contracts are being placed which are to be fulfilled irrespective of when the war terminates. The only solution for those threatening eventualities, according to Mr. Ryan, is the immediate development of foreign markets for American-manufactured products.

Mr. Ryan proposes that manufacturers producing similar lines organize themselves into effective bodies to study and develop foreign markets. He recommended that the convention urge early a favorable action on the Webb bill, legalizing export combinations which again is before congress.

Business Must Make Sacrifices

Secretary of the Interior Lane and Secretary of War Baker, in behalf of the government, both urged upon business the responsibility which it must assume and the sacrifices which it must make if the country is to win the war. "Industry," said Secretary Baker, "must impose upon itself the same sacrifices demanded of the men called into the trenches." Secretary Lane said: "No man is entitled to anything he does not now put to the use of the nation and the world. You men do not want your sons to be able to say they did their bit abroad while you remained at home and made money out of the war. The worst danger that we must face is that of discontent from within. It may grow out of domestic conditions and the business man can do much to keep it from breaking out, by marking down his prices to the public on the common place of life. Herbert C. Hoover, national food administrator, declared that starvation would win the war. He said the neutral countries of Northern Europe canot expect to get food from this country unless they furnish equivalent services in other directions against Germany.

Lord Northcliff, head of the British Commission of this country, said he was spending between $50,000,000 and $60,000,000 a week. He outlined the fundamental industrial changes in Great Britain, some of which he said would be experienced by this country.

South American Trade Waits

Daniel Warren, vice president of the American Trading Co., discussed Pan-American trade and the war. He spoke of the millions of dollars worth of merchandise ordered months ago, which now is tied up by export embargoes. He suggested that the government make a ruling the same as on ship and tank plates, whereby all goods manufactured on a certain date and delivered to cars prior to a specified time be allowed to go forward. Another suggestion made was that something similar to the British statutory list should be adopted; that more thought should be given to the standardization of other products, besides steel, so that the Latin-American buyer will receive a uniform grade of goods regardless of the part of this country from which it is shipped. He spoke of the splendid spirit of loyalty which the Latin-Americans now are displaying toward Pan-Americanism, notwithstanding the unfair methods previously used to prejudice them against this country. "By fostering their good will and proving to them that the standard of commercial honor in the United States is without reservation the highest in the world, we will be able to form a foundation for future Pan-American trade", said Mr. Warren.

Generous Trade Policy After War Necessary

THERE is universal recognition among the allied nations that the war will be won to but little advantage unless there can be insured a peace that will not be ruthlessly broken. Our entrance into new fields of business enterprise abroad have been of benefit not only to the countries where the investments had been made, but to the original investors whose work had been taken up at the point where they were compelled to lay it down. Our entrance into the war leaves us still free to pursue the same policy, and it has given us a new title to insist that after the war co-operation on the broadest and most generous scale, and in the most sympathetic spirit, must be the rule, if economic recovery is to be quick and thorough. The activities of the United States in the war will acquire all the more force because they are meant to achieve the triumph of international right and justice and to serve no ends prompted merely by national selfishness or national self-interest.—JAMES A. FARRELL.

A company headed by St. Louis capitalists is planning to develop manganese ore mines in the locality of Nashville, Ark.

Exhibition Shows Influence of War

Unusual Demand for Labor Saving Devices, Tendency Toward Standardization, and Increased Interest in Munitions Problems Indicated by Exhibits at Boston Display of Foundry and Machine Shop Equipment

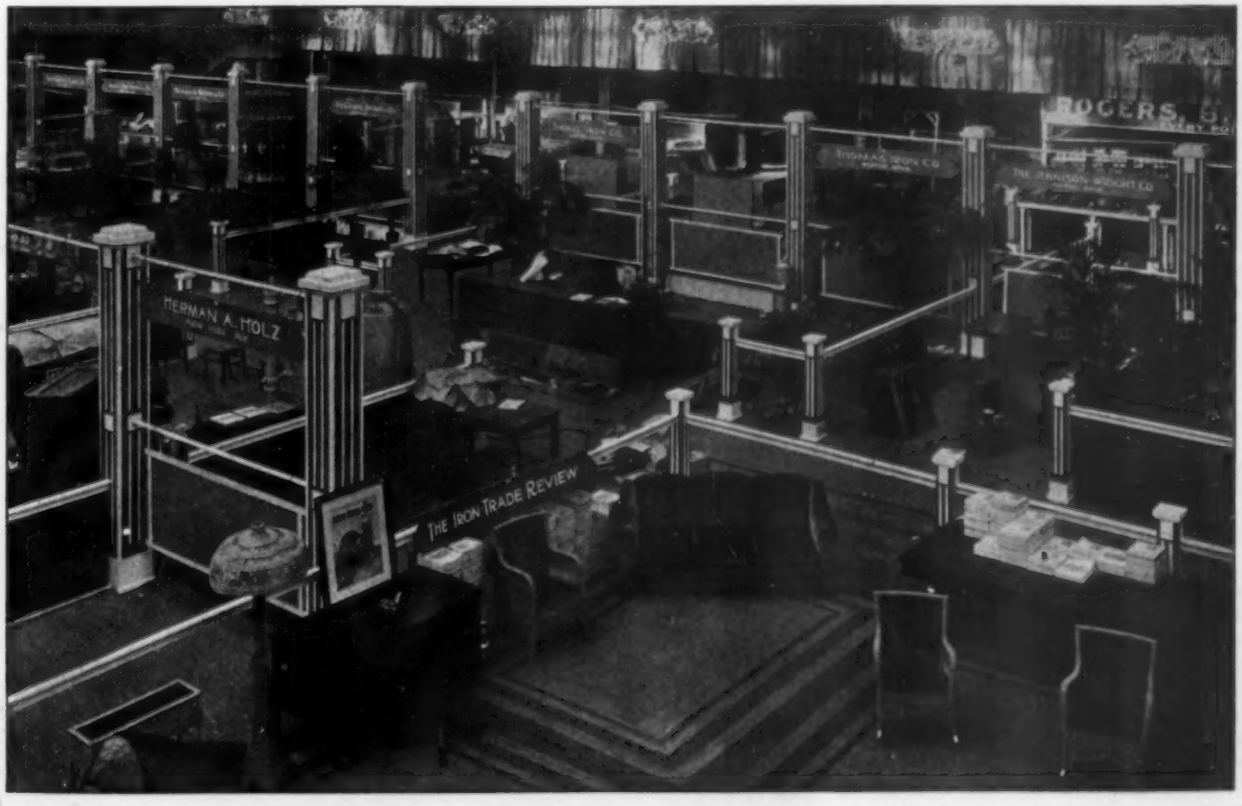
IT IS fitting that in this year of renewed national ideals, the country's exhibition should be held in Boston, the cradle of American genius and liberty. It is even more gratifying, in view of the war raging on three continents, that Americans still have time and energy to devote to constructive purposes and to the study of improved methods of production. As a matter of fact, manufacturers the country over have never before stood so vitally in need of more efficient shop machinery and equipment. This condition is attested by the unusual interest displayed in the twelfth annual foundry and machine exhibition, which opened its doors in the Mechanics building, Boston, at 1 o'clock Monday afternoon. Not only was the show the largest of its kind ever held, but the attendance far surpassed previous records.

The two vast floors of the great Mechanics pavilion were crowded with exhibits. As the accompanying illustrations indicate, the show was unusually well arranged and beautifully decorated. Well lighted rooms and high arched ceilings contributed materially to an attractive general effect.

As at several previous exhibitions, molding machines and sand-blast apparatus held the center of the stage. Over 90 molding machines and 15 sand-blasting outfits were in operation throughout the week. The very latest types, of course, were displayed for inspection. In fact, the annually recurring foundry and machine exhibitions afford an excellent opportunity to make both quantitative and qualitative analyses of the year's progress in the manufacture of foundry and shop appliances of all kinds. Furthermore, if the shows offered no further advantages, they would be well worth while, for it has long since been demonstrated in the foundry industry that the rate of progress is dependent almost directly on the effectiveness of the available facilities for the interchange of information. The molding machine manufacturers particularly appreciate the opportunity once a year to meet not only their customers, but their competitors.

A survey of the exhibits at the Boston show leads easily to the conclusion that molding machines are now thoroughly standardized. Radical innovations are the exception rather than the rule. Improvements consist in refinements of detail, and as in the case of the much-heralded Liberty aeroplane motor, in new combinations of thoroughly tested elements. Not over three radically new molding machines were exhibited, but the minor improvements and refinements evident on practically every machine prove conclusively that manufacturers have not been idle during the past 12 months.

At the present stage of the development of the molding machine business, attention is being centered on precision in manufacture and improvements designed to still further reduce the manual efforts of the molder. Owing to the widespread shortage of labor, now being augmented by the operation of the selective service law, the demand for machines that will save human effort is more insistent than ever. Furthermore, molders are constantly becoming more captious, and in some sections of the



TASTEFUL AND ATTRACTIVE DECORATIONS FEATURED THE BOSTON EXHIBITION

"THE HUB" DONE IN BY-PRODUCT COKE

country even arrogant, with the result that foundrymen see more keenly than usual the necessity for machines designed not only to replace men, but to reduce to a minimum the demands on the muscles and intelligence of the relatively few operators that may be required. Molding machine manufacturers are fully awake to this situation and they are co-operating with the foundrymen with characteristic energy. The latest machines, such as those displayed on both floors of the great Mechanics building at Boston, perform all of the operations connected with making a mold, some of them even being provided with auxiliary apparatus for filling the mold with sand and for carrying away the completed flasks. In many cases the workman is called upon to do nothing more fatiguing than opening an air valve or operating an electric switch.

In superiority of finish and precision in the manufacture of its working parts, the molding machine of 1917 forms a striking contrast with its predecessor of 1907. Today many molding machines are machine tools in the fullest sense of the word; their parts are as accurately made and carefully fitted as those of a fine lathe or milling machine. In many cases, the moving parts run in an oil bath and the design is such that no sand can find its way into the bearings or between fitted surfaces. It is such refinements as these that make it possible to use molding machines for the production of high-power, complicated, multi-cored automobile and aeroplane cylinder blocks with metal sections pared to 5/32 inch. In fact, in such cases, the machines turn out work that the most skilled hand molder cannot duplicate. In spite of these improvements, molding machines are relatively cheaper than they were 10 years ago.

Roll-Over Machine of New Type

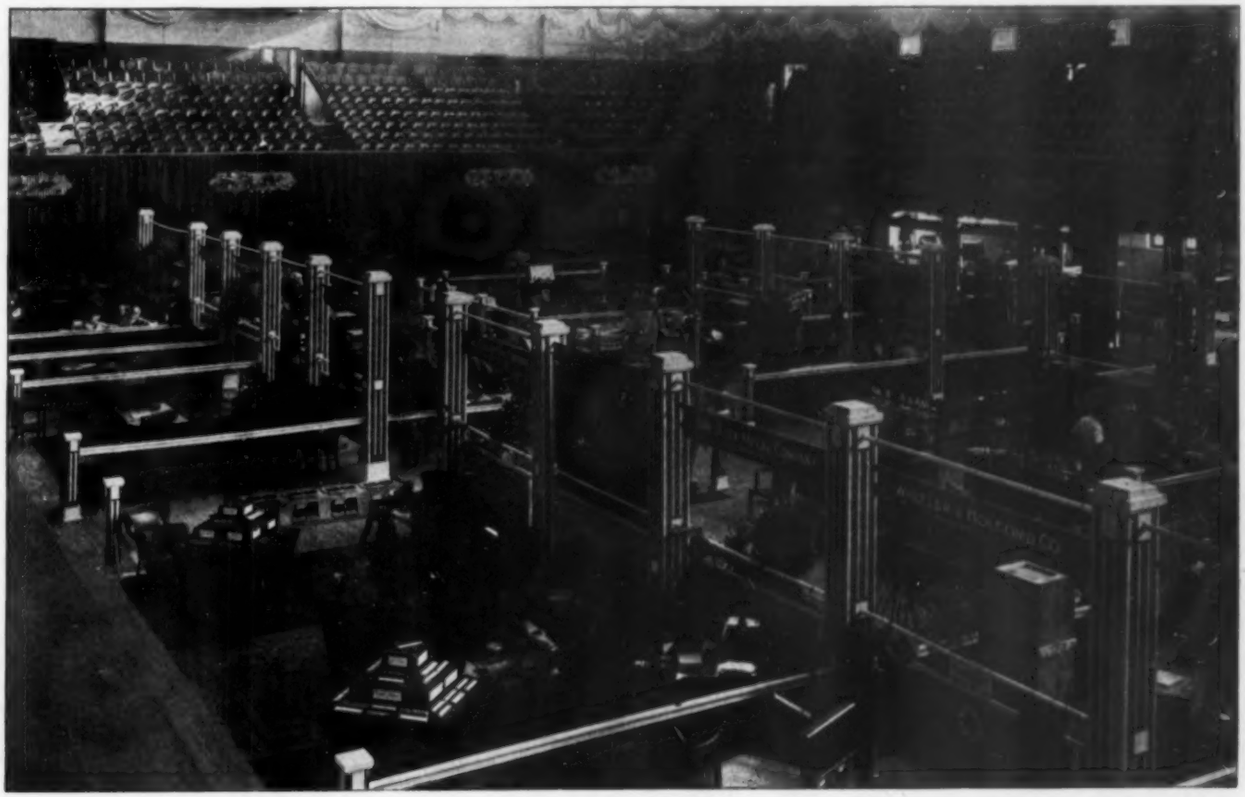
An unusually interesting machine of a new type was displayed by the American Molding Machine Co., Terre Haute, Ind. This machine, which was shown in operation, was designed by W. C. Norcross. It is of the combination roll-over jolt type, pneumatically operated. Instead of employing separate units, however, the roll-over and ramming functions are controlled by a single air cylinder. When jolting the mold, this cylinder operates in the usual manner. For the roll-over operation, a unique link motion and an automatic latch are brought into play. The mold is balanced at the center and virtually no force is required to roll it over. An oil-filled balancing cylinder is provided to steady the roll-over operation. The flask is turned onto an automatic ball-and-socket leveling device that is self-compensating for any irregularities in the flask or mold. The machine on exhibition was provided with 30 x 40-inch table and a cylinder 10 inches in diameter.

The American Molding Machine Co. also exhibited a combination jolt-stripping plate machine with a 24 x 36-inch table and a 12-inch draw. One cylinder jolts the flask and draws the pattern. The stripping operation is performed by first raising the flask to the full height of the draw, in which position it is held by four steel rods. The pattern is then drawn through the stripping plate by exhausting the air slowly from the cylinder. The four rods that hold up the flask and stripping plate are supported by spring-actuated dogs which automatically engage slots milled in the lower ends of the rods.

The new Morrison electric jolt machine was exhibited by the E. J. Woodison Co., Detroit. This machine has a number of features which tend to make it easy for a relatively ignorant or inexperienced handyman to operate it. It is claimed in particular that it is virtually impossible for the operator to ram the mold either too hard or not hard enough. This is accomplished by providing the machine with a dial that reg-

MISCELLANEOUS EXHIBITS IN THE BASEMENT OF THE GRAND HALL

isters the number of blows; every flask, therefore, can be correctly rammed. The machine is driven by a motor placed on a column. The jolt, which is produced by a cam-wheel mechanism, is controlled by a hand lever on the side of the machine. The roll-over feature is operated by a crane arm provided with a cable, one end of which is wound around a drum on the cam-wheel shaft. The jolt is received on four steel anvils. The pattern is drawn by means of a socket wrench fitted on the end of a shaft. This is accomplished after the flask is rolled-over; therefore, no leveling device is necessary. The machine exhibited will take flasks up to 20½ x 40 inches. A 12-inch pattern draw is provided. The machine requires 32 x 84 inches of floor space.



GENERAL VIEW OF GRAND HALL, MECHANICS BUILDING, BOSTON, DURING THE TWELFTH ANNUAL FOUNDRY AND MACHINE EXHIBITION

Six-Cylinder Motor Casting

The central feature of the exhibit of the Osborn Mfg. Co., Cleveland, was a 260-horsepower 6-cylinder aircraft motor casting made on an Osborn jolt-ramming machine. This casting is one of a lot manufactured by Allyne-Ryan Foundry Co., Cleveland for the Kessler Motor Co., Detroit. It is an excellent example of the possibilities of the modern molding machine. The metal sections in some places are less than 3/16-inch, and each mold contains 800 pounds of cores. The Osborn company also exhibited a combination stripping-plate squeezer machine and a number of plain, pneumatic jolt-ramming machines, together with other examples of its complete line of labor-saving devices for the molding floor.

The well-known molding machines manufactured by Henry E. Pridmore, Chicago, were shown in operation. In the past year a number of refinements and improvements have been introduced, for the purpose of making the machines easier to operate and more accurate in action. A new 20 x 24-inch combination jolt-stripping plate machine, with electric jolting and pneumatic stripping actions was shown in operation making molds for Ford rear-axle housings. A 36-inch combination air-electric rock-over jolt machine was displayed, together with a 24-inch plain pneumatic rock-over drop machine of the type originated by the late Henry E. Pridmore. The visitors during the week were also attracted to an aluminum model of a Pridmore electric jolt-ramming machine. The model was sectionalized so the functions of the various working parts were clearly visible. A number of fine, intricate gray iron castings made on Pridmore machines also were displayed; one was fitted with a ferrule plate. The exhibit also included a combination jolt-ramming squeezer machine, air and hand squeezers, piston molding machines, midget core jar-ramming machines and the Brillion pouring device.

An air squeezer equipped with a pneumatic vibrator and a lifting device was prominent in the exhibit of the Berkshire Mfg. Co., Cleveland. In addition, a complete line of wood, iron and aluminum flasks and specially designed aluminum match-plates were displayed. The match-plates are made of a special metal and where extreme accuracy is desired their use is recommended.

The B. & B. Manufacturing Co., Indianapolis, exhibited power and hand squeezers. Both portable and stationary machines were displayed. Several sizes and styles were shown.

Machines Without Valves

Jolt-ramming machines without valves were displayed by the Federal Foundry Supply Co., Cleveland. The exhibit included six different sizes of machines. In the operation of these machines, the opening of the exhaust automatically shuts off the intake; the expansive force of the air then forces the piston the remainder of its stroke, fully opening the exhaust. As soon as the pressure is released, the piston drops to its starting point. Six different types of power squeezers and combination jolt-squeezer machines also were shown. The squeezers are

provided with extra long cylinders and heavy leather pistons which assist in the conservation of air. One of the combination jolt-ram-squeezer machines had a 4-inch jolting cylinder and a 9-inch squeezing cylinder; the other was equipped with a 5-inch jolting and a 12-inch squeezing cylinder. The plain power squeezers displayed had cylinders 9 and 12 inches in diameter, respectively.

Standard plain jar-ramming and combination jar-ramming and squeezing machines were displayed by the Herman Pneumatic Machine Co., Pittsburgh. These machines were not in operation. In addition, the Herman company furnished its booth in a comfortable manner for the entertainment of its customers and visitors.

Specimens of the complete line of molding machines which it manufactures were exhibited by the International Molding Machine Co., Chicago. This exhibit included electric and pneumatic jar-ramming molding machines, plain squeezers, combination jolt-squeezers and stripping-squeezers, together with hand turn-over draw, power turn-over draw and combination jar-ramming turn-over draw machines. In designing these machines an effort has been made to provide ample reserve strength, together with simplicity of adjustment and accuracy of operation.

Machine for Women

A small jar-ramming roll-over machine suitable for core-room operation by women was one of the features of the exhibit of the Midland Machine Co., Detroit. This machine can be operated with a minimum of manual exertion, and at the same time cores of uniform quality can be turned out rapidly. Other types of Grimes roll-over molding machines also were displayed, and interesting motion pictures of molding machine operations were shown.

As at previous exhibitions, the Mumford Molding Machine Co., Chicago, displayed large-scale sectional drawings of its latest type machine which is equipped with a valve action specially designed to produce a maximum ramming effect with a minimum of air consumption.

Swing-head squeezers of the characteristic type invented by William Nicholls were exhibited in operation by Wm. H. Nicholls Co., Brooklyn, N. Y. Two combination jolt-ramming squeezer machines with an automatic gravity pattern drawing device were also displayed by the Nicholls company. Richey, Browne & Donald, Maspeth, N. Y., exhibited their roller-ramming machine which is suitable for certain classes of work.

Swing-head machines of the plain squeeze and combination types were displayed by the United States Molding Machine Co., Cleveland. The thrust of the squeeze is absorbed by a heavy T-section casting which is stayed on one end by a forged rod. Six different types of machines were displayed.

The E. H. Mumford Co., Elizabeth, N. J., displayed its jolt rock-over draw machine. This machine is designed according to the principles invented by the late E. H. Mumford. An oil-controlled guide plunger is provided, which in combination with an improved starting valve is said to insure a smooth start and a uniformly accelerated draft.

Sand-Blast Apparatus

Further development in automatic sand-blast apparatus was evident in the displays at Boston. Also it is apparent that self-contained sand-blast units are growing in popularity among foundrymen. As a result of legislation and a more enlightened appreciation of the importance of the welfare question, foundrymen today are not content with sand-blast apparatus in which the dust-disposal problem has not been thoroughly worked out. The day has passed, therefore, when sand-blast machinery is purchased piecemeal and operated without attempting to control the dust nuisance.

A 20 x 34-inch gravity-type, positive feed, revolving-barrel sand-blast machine, with a capacity of three to five tons of castings a day was displayed by the Brown Specialty Machinery Co., Chicago. In this machine the sand flows from the main hopper into the auxiliary hoppers and thence to the nozzles by gravity. The air consumption of the machine exhibited is stated to be 75 cubic feet per minute. A larger machine of the same type also is built. It has a 40 x 50-inch barrel, with an air consumption of 300 cubic feet per minute and a rated capacity of 15 to 20 tons of gray iron or malleable castings a day. The smaller machine is driven by a 2-horsepower motor. The one displayed at Boston has been sold to the government for installation at the Algiers arsenal near New Orleans. The Brown company also displayed its duplex sand sifter and the Hammer core machine.

The display of the W. W. Sly Mfg. Co., Cleveland, in the Exhibition hall adjoining the Grand hall included a complete steel-plate sand-blast room with dust disposal apparatus. This room, which was provided with a closed-hopper sand-blast machine and a grated floor, was approximately 10 x 12 feet in size. A sand-blast barrel with complete dust-handling and sand-renovating auxiliaries also was shown by the Sly company, together with a double unit 6-drawer core oven.

The J. W. Paxson Co., Philadelphia, showed two sizes of its closed-hopper Paxson-Warren sand-blast machine. This machine is designed either for high or low pressure operation. A magnetic separator, a model of a cupola equipped with the Zippler tuyere system and a full line of foundry supplies also were exhibited by the Paxson company.

A sand-blast room of special design in which the operator is said to be practically immune from dust was displayed by the American Foundry Equipment Co., New York. This company also showed several other types of sand-blast machinery, together with its well-known traveling sand-mixing machine.

The Hoevel Mfg. Corp., New York, displayed a large sand-blast barrel and an 8-foot rotary table sand-blast machine. These machines were connected to automatic dust-collecting and sand-renovating units, making them entirely self-contained. The entire exhibit was operated by a 10-horsepower motor.

A large automatic sand-blast barrel and an automatic sand-blast cabinet machine, with dust-collecting and sand-handling units were exhibited in operation by the Mott Sand Blast Mfg. Co., New York.

Large Muller Takes Heavy Charge

The National Engineering Co., Chicago, exhibited a 6-foot sand muller, operated by a 10-horsepower motor. This machine has a capacity of from 7 to 10 cubic feet per charge. It is said it will mix up a batch of gray-iron facing sand in three to four minutes and a batch of core sand in two to three minutes. The two cast-iron mullers have chilled rims; the plows also are cast iron with chilled surfaces.

Among other exhibitors of sand-blasting, sand-sifting and sand-handling apparatus were the Pangborn Corp., Hagerstown, Md.; Blystone Mfg. Co., Cambridge Springs, Pa.; Champion Foundry & Machine Co., Chicago; Great Western Mfg. Co., Leavenworth, Kans.; Harrison Supply Co., Boston; J. A. Macleod Co., Cincinnati; and New Haven Sand Blast Co., New Haven, Conn.

Foundry and sand-blast sands were exhibited by the Portage Silica Co., Youngstown, O., and the Albany Sand & Supply Co., Albany, N. Y. The latter showed a stove made at the Walker & Pratt foundry, Boston, with Albany sand and the former a full line of samples of silica sand, sand-blast sand, gravel, etc. Foundry sands also were displayed by several

of the large dealers in foundry supplies.

An unusually large variety of machinery for machine and pattern shops was displayed at the Boston show. The Gardner Machine Co., Beloit, Wis., exhibited horizontal and vertical disc grinders, several of which were equipped with exhaust systems. A horizontal disc grinder, motor-driven and provided with an exhaust blower made by the Buffalo Forge Co., Buffalo, N. Y., attracted considerable attention. Samples of work done on disc grinders were displayed.

Vertical and horizontal spindle disc grinders were exhibited by Charles H. Besley & Co., Chicago. The various machines were driven by belts from a single countershaft connected to a motor. Single and double spindle machines for pattern shops formed part of the exhibit.

A gear hobbing machine was shown in operation by the Bilton Machine Tool Co., Bridgeport, Conn. This exhibit also included an automatic gear-cutting machine and a drill press made by the company. The gear-cutting and hobbing machines are designed for gears up to 10 inches in diameter and as coarse as 8 pitch.

Belt and motor-driven grinding and polishing machinery was displayed by the Bridgeport Safety Emery Wheel Co., Bridgeport, Conn. A thread-milling machine and a gear generator built by the Lees-Bradner Co., Cleveland, were exhibited by Lynd-Farquhar Co., Boston, New England representative of the Lees-Bradner Co.

The Cincinnati Pulley Machinery Co., Cincinnati, showed seven vertical single-spindle drill presses, one of which was designed for motor drive. One 2-spindle and one 3-spindle drill were also exhibited. Hill, Clarke & Co., Boston, exhibited machine tools.

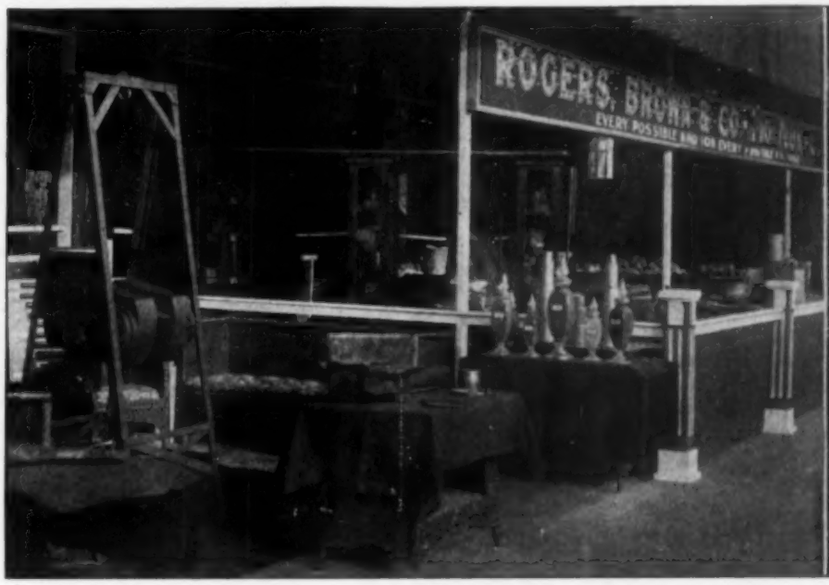
A small bench planer, designed to do the work usually performed by a hand plane, was exhibited by J. D. Wallace & Co., Chicago. The cutter of the machine is direct connected to a ¼-horsepower General Electric motor operating at 4000 revolutions per minute. The table is adjustable and the fence can be tilted to any desired angle. The cutter is covered by a knurled shield which is pushed away by the material to be planed when it approaches the revolving cutter. Another shield supported by a universal joint covers the exposed portion of the cutter. The bench planer is especially designed for pattern-shop work.

The machine-tool exhibit of the Warner & Swasey Co., Cleveland, consisted of a hollow hexagon turret lathe, a turret screw machine and a plain head turret screw machine. The first named machines were shown in operation, bar stock being finished into screw machine products. All of the machines were motor driven.

Four double-spindle grinding machines were shown in operation by the Norton Co., Worcester, Mass. The safety devices attached to these machines were noticeable, the wheels being protected by guards and the belts being screened by box-shaped wire cages. Each machine was equipped with an exhaust system for carrying away the dust. In addition to the grinding machines, a wide variety of wheels for various kinds of grinding work were displayed.

Quick-change drill chucks were demonstrated by the McCrosky Reamer Co., Meadville, Pa. This exhibit also included adjustable and plain reamers, tool posts for lathes, holders for turret lathe tools and universal lamp brackets for machine tools. Part of this equipment was shown in actual use on drills and lathes.

Two power hammers were demonstrated in the booth of Beaudry & Co., Boston. These hammers, which are designed for motor drive, operate at a pulley speed of 275 revolutions per minute. The action of the foot treadle regulates the movement of the hammer and controls the pressure of an idler against the driving belt. The hammers displayed were of 50 pounds and 100 pounds capacity, respectively.



A CORNER IN THE GRAND HALL SHOWING EXHIBITS OF WELDING MATERIALS AND PIG IRON

ONE OF THE EXHIBITS OF SAND-SIFTING APPARATUS

The Oliver Machinery Co., Grand Rapids, Mich., exhibited a 16-inch toolroom lathe. Pictures of pattern-shop machinery, including a universal wood milling machine were shown. A pipe-bending machine equipped with adjustable parts for bending pipe into various intricate shapes was demonstrated by representatives of the American Pipe Bending Machine Co., Boston. Internal grinders, a threading tool and a back-geared precision bench lathe mounted on a cabinet with individual motor drive and attachments were shown by the Rivett Lathe & Grinder Co., Boston.

The growing popularity of pneumatic machinery in foundries and machine shops was evidenced by the unusually complete exhibits of manufacturers of air-operated equipment. The Sullivan Machinery Co., Chicago, operated a 14 x 8¾-inch angle compound air compressor. This compressor,

which is equipped with improved plate valves and driven by a 75-horsepower General Electric motor, delivered air to the various pneumatic tool exhibits. The capacity of the machine is 445 cubic feet of free air against a terminal pressure of 100 pounds per square inch when operating at 250 revolutions per minute. An 8 x 8-inch belt-driven single-stage compressor of the totally enclosed type was also displayed. This exhibit included other pneumatic equipment and a photographic display of machinery made by the Sullivan company.

In addition to a large motor-driven air compressor, which delivered air to some of the pneumatic tool exhibits, the Chicago Pneumatic Tool Co., Chicago, showed a full line of pneumatic hoists, chipping hammers, rammers, drills, grinders and electric drills, grinders, sand shakers, etc. A pneumatic hammer and a drill, with sections cut away to show the valve mechanism in action, were interesting features of this exhibit.

Pneumatic tools and accessories, including 250 different pieces of equipment, were exhibited in the booth of the Cleveland Pneumatic Tool Co., Cleveland. Sand rammers for floor, flask and bench ramming, chipping hammers, drills and portable grinders were shown in operation. The sand rammers are equipped with exhaust clips which deflect the exhaust air downward into the sand, thus protecting the operator. The portable grinders are designed for wheels from 6 to 10 inches in diameter and operate at from 3000 to 3300 revolutions per minute. Bowes air-hose couplings were also exhibited.

A vertical double-cylinder single-acting compressor, water cooled with a regulating sight feed splash oiling system was operated by the Curtis Pneumatic Machinery Co., St. Louis. This compressor supplied air for hoists and trolleys which formed part of the exhibit. A single I-beam hand operated bridge crane with trolley and a single I-beam bracket jib crane were shown. Vertical cylinder air hoists suspended from I-beam trolleys were also exhibited.

Centrifugal air compressors for cupola blowing formed an important part of the exhibit of the General Electric Co., Schenectady, N. Y. One of the compressors was set up for 50-horsepower alternating-current motor drive and the other for 20-horsepower direct-current motor drive. The compressors are adapted to motor or turbine drive. The unit driven by the 50-horsepower motor has a capacity of 7200 cubic feet of air per minute. When driven by a direct-current motor, the pressure is regulated by changing the speed of the set by a field rheostat. When driven by an induction motor, the blast is regulated instead of the motor. The core oven exhibit of the General Electric Co. is described elsewhere in this article.

Circular saws made by the Simonds Mfg. Co., Fitchburgh, Mass., were demonstrated on a metal sawing machine made by Nutter & Barnes, Hinsdale, N. H. Steel bars about 8 inches in diameter were sawed in this machine. The Simonds company also exhibited various types of metal cutting saws, including circular, hack and band saws. Files were also displayed.

Hack saw blades and frames, hand saws, circular saws, metal cutting machines and core plates were shown by the E. C. Atkins & Co., Indianapolis, Ind. The Athol Machine Co., Athol, Mass., displayed a large variety of shop tools including calipers, dividers and vises. The vises are equipped with nonslidable handles, which have a ratchet connection with the vise-head screw, allowing the handle to be swung at any desired handle without disturbing the position of the vise jaws. A feature of the exhibit is a small model of a meat chopper, the first invention of L. S. Starrett.

Four power-driven magnetic separators were exhibited by the Dings Magnetic Separator Co., Milwaukee. One of these machines was equipped with a motor, another with a motor-generator set and a third with a hand magnet. The other separator was of the magnetic pulley type with motor.

Welding and Cutting Apparatus

The exhibits of welding and cutting apparatus for foundry cleaning rooms and for general repair work were unusually interesting because in practically every booth where this type of equipment was displayed demonstrations of the actual process of cutting or welding were given. The Ox-weld Acetylene Co., Newark, N. J., produced acetylene in a generator having an hourly capacity of 50 cubic feet. This gas was used in cutting and welding pipe and other iron and steel articles. The exhibit also includes display of welding and cutting torches, tips, etc.

A large crankshaft welded by the thermit process was exhibited by the Goldschmidt Thermit Co., New York. Pictures of unusual welding jobs were displayed and pieces of plain, coupled and welded pipe which had been tested for tensile strength, bursting strength and vibration were shown. Samples of carbon-free metals and alloys made by the Goldschmidt company were also displayed.

The Davis-Bournonville Co., Jersey City, N. J., exhibited various kinds of oxy-acetylene cutting and welding apparatus and accessories. The accurate cutting of plates by an acetylene torch was demonstrated on a machine provided with a table for holding the work and a special holder for the torch. Gas used in the cutting and welding apparatus for demonstrating purposes was generated in a generator made by the Davis-Bournonville Co.; it had a capacity of 100 cubic feet of acetylene per hour.

Grinding wheels and abrasive materials were shown by the Carborundum Co., Niagara Falls, N. Y. Divine Bros., Utica, N. Y., displayed a number of compress polishing and buffing wheels, glue for polishing purposes and cushion wheels for trucks.

Among the companies exhibiting crucibles were the Joseph Dixon Crucible Co., Jersey City, N. J.; New Chicago Crucible Co., Chicago; Foreign Crucibles Corp., Ltd., New York; and the O. K. Crucible Co., New York.

The manufacturers of metals and alloys used in the foundry industry departed from the usual display of ingots, and arranged interesting exhibits of castings made from their metals. This was especially true of the booth of the Ajax Metal Co., Philadelphia. The castings shown included a submarine engine base of extra strong manganese bronze, plastic bronze bushings, bearings and boxes for large locomotives, machine-gun castings, railroad car fittings, fire engine castings and turbine parts. Ingots of various metals and alloys made by this company were also shown.

Castings made from metals of the Michigan Smelting & Refining Co. were shown. This company also showed ingots of copper, brass, tin, babbitt, special alloys and aluminum. Other exhibitors of metals and alloys who showed ingots and castings were the Eastern Brass & Ingot Corp., Waterbury, Conn., and S. Birkenstein & Sons, Chicago. The Titanium Alloy Mfg. Co., Niagara Falls, N. Y., exhibited ferro-carbon-titanium and castings made by the Titanium Bronze Co., Niagara Falls, N. Y., an allied company.

In this year's show, as in those of the past, the exhibits of coke were unusually attractive. The large reproduction of Bunker Hill monument executed in coke made by the New England Coal & Coke Co., stands out as the most elaborate exhibit of the Boston show. This monument, rising nearly to the ceiling of the Grand hall, was surrounded by four large statues showing typical Puritans in the costume of their time. Colored lights hanging in festoons from the top of the monument and potted

plants added to the attractiveness of the exhibit.

The exhibit of Pickands, Brown & Co., Chicago, consisting of a large hub made of Solvay coke, attracted considerable attention. Rogers, Brown & Co., Cincinnati, displayed a large number of fine castings made from the various grades of pig iron handled by that company. Samples of many kinds of pig iron, bee-hive and by-product cokes, and ferroalloys were shown. The Debevoise-Anderson Co., Inc., New York, showed samples of coke, pig iron, limestone, coal and 50 per cent ferro silicon. The Thomas Iron Co., Easton, Pa., showed samples of pig iron and test bars and typical castings from the iron made by the company.

As usual, the manufacturers of core compounds maintained comfortable booths for visiting foundrymen, and displayed cores and castings in which their products were employed. Among the exhibitors of core compounds were the American Gum Products Co., New York; Robeson Process Co., New York; Werner G. Smith Co., Cleveland; Spencer Kellogg & Sons, Inc., Buffalo; Cataract Refining & Mfg. Co., Buffalo; United Compound Co., Buffalo; United States Graphite Co., Saginaw, Mich.; J. S. McCormick Co., Pittsburgh; Corn Products Refining Co., New York.

Core Ovens

Core and mold ovens of the car and drawer type, core cars, melting furnaces, oil burners, etc., were shown in the booth of the Foundry Equipment Co., Cleveland. The General Electric Co., Schenectady, N. Y., operated an electric core oven made by the Oven Equipment & Mfg. Co., New Haven, Conn. The oven is equipped with pyrometers made by the Taylor Instrument Co., Rochester, N. Y. A coremaker made cores which were dried in this furnace. The G. S. Blodgett Co., Burlington, Vt., exhibited three types of core baking ovens.

Crucible and noncrucible melting furnaces were shown by the Buckeye Products Co., Cincinnati. The Ludlum Electric Furnace Co., New York, showed a working model of the new Ludlum furnace. Samples of the castings from this furnace and pictures of the furnace in actual operation were displayed. The Monarch Engineering & Mfg. Co., Baltimore, exhibited an unusually complete line of tilting, stationary and portable furnaces for melting metals. In addition to a large variety of miscellaneous foundry equipment, the S. Obermayer Co. exhibited a brass melting furnace.

The Quigley Furnace Specialties Co., New York, demonstrated a high-temperature cement adapted for use in repairing crucibles, lining cupolas and melting furnaces, etc. Brick which had been bonded by the cement was burned in an electric furnace at a heat of about 3200 degrees.

The General Fire Extinguisher Co., Providence, R. I., exhibited various parts of automatic sprinkling equipment, including the telegraphic equipment for central station alarms. A sprinkler head in a glass covered compartment afforded an opportunity to demonstrate the action of the heads when subjected to the heat of a fire.

Wood blocks for floors were exhibited by Ayer & Lord Co., Chicago, and the Jennison-Wright Co., Toledo, O. Safety equipment including shoes, goggles, clothing, etc., was shown by the Safety First Shoe Co., Providence, R. I.; R. P. Smith & Sons Co., Chicago; Strong, Kennard & Nutt Co., Cleveland; Julius King Optical Co., New York. The Lamson Co., Boston, showed various conveying systems for handling foundry materials.

Electric hoists for foundries were shown by the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y. Monorail track and trolley accessories were also shown. Photographs of hoisting apparatus were displayed by the Hayward Co., New York. Among the other exhibitors whose booths attracted attention were Felt & Tarrant Mfg. Co., Chicago; Abell-Howe Co., Chicago; Forbes & Myers, Worcester, Mass.; American Lighting Co., Chicago; Pittsburgh Crushed Steel Co., Pittsburgh; Armstrong Cork Co., Pittsburgh; Asbury Graphite Co., Asbury, N. J.; General Platers Supply Co., New York; Hart & Hutchison, New Britain, Conn.; Hauck Mfg. Co., Brooklyn, N. Y.; Standard Equipment Co., New Haven, Conn.; Sterling Wheelbarrow Co., West Allis, Wis.; W. F. Stoddard, Syracuse, N. Y.; Frank D. Chase, Chicago; Chase Turbine Mfg. Co., Orange, Mass.; Lewis-Shepard Co., Boston; Chisholm-Moore Mfg. Co., Cleveland; United Metal Hose Co., New York; David Lupton's Sons Co., Philadelphia; Charles J. Clark, Chicago; Cleveland Blow Pipe & Mfg. Co., Cleveland; United States Silica Co., Chicago; Mahr Mfg. Co., Minneapolis; Malleable Iron Fittings Co., Branford, Conn.; Cleveland-Osborne Mfg. Co., New York; Thomas E. Coale Lumber Co., Philadelphia; White & Bros., Inc., Philadelphia; McLain's System, Inc., Milwaukee; Combined Supply & Equipment Co., Buffalo; Moltrup Steel Products Co., Beaver Falls, Pa.; Cutter & Wood Supply Co., Boston; T. B. Wood's Sons Co., Chambersburg, Pa.; Norma Co. of America, New York; G. Drouve Co., Bridgeport, Conn.; and Whiting Foundry Equipment Co., Harvey, Ill.

Livelier Market

Shown in Coke By-Products—Phenol is Growing Stronger

New York, Sept. 25.—Sales of benzol again were brisk the past week and total bookings exceeded anything that had been done in a like period for some time past. Most of the purchases called for spot and nearby shipments. One order alone, on which deliveries are to be made over the next three months, ran into several hundred thousand gallons. The market continues firm. Pure benzol is firm at 53 to 58 cents per gallon at producer's plant for spot shipment and 53 to 55 cents for contract. Numerous transactions in phenol also have been closed. However, although there is a huge amount of contract inquiry in the market, practically the only business closed has been for spot. Producers generally are inclined to expect advancing prices and therefore are not disposed to sell for the future. Spot phenol is quoted around 42 cents per pound.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.53 to .58
Toluol	1.70 to 1.80
Solvent naphtha	.16 to .18
Per Pound at Producers Plant	
Phenol	$0.42
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$4.90 to 5.05

Contract

Per Gallon at Producers Plant	
Pure benzol	$0.53 to .55
Toluol	1.50 to 1.80
Solvent naphtha	.16 to .18
Per Pound at Producers Plant	
Phenol (nominal)	$0.42
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

In toluol, despite the sold-up condition, a few spot transactions were closed during the week. This went around $1.75 per gallon at producer's plant. The quantities were not large. Solvent naphtha continues quiet on actual business, although there is a better inquiry. The market rules from 16 to 18 cents at producer's plant, both for spot and contract. Due to the difficulty in obtaining supplies from England, various British colonies continue to inquire for round lots of sulphate of ammonia. Owing to the sold-up condition of producers, however, none of this business is finding takers. Sales of the week consisted of a few spot lots which went at higher prices than previously and the market now is quoted at $4.90 to $5.05 per 100 pounds at seaboard for spot.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

JAMES E. FERGUSON, president of the Ferguson Steel & Iron Co., Buffalo, has entered the service of the government and has been commissioned a captain in the United States signal corps, with the position of manager of inspection for the Buffalo district as his particular duty. He will inspect through his office, all airplanes, automobiles for war purposes, telegraph and radio instruments made in the Buffalo district. The district comprises Buffalo, Rochester, Syracuse, Hammondsport, the remainder of western New York and northern Pennsylvania. Four years ago Mr. Ferguson organized the Ferguson Steel & Iron Co., and since that time it has been necessary to enlarge the capacity of the plant several times. Previous to coming to Buffalo, six years ago, he was connected with Joseph T. Ryerson & Son, Chicago. "He began business," says the *Buffalo Express*, "in a structure 100 feet wide and 150 feet long. Today four and one-half acres are under one roof. His time and ability now are at the command of the government for $1800 a year." In his official capacity Mr. Ferguson at present has 100 men under him, but this number will be increased to 300 shortly. His first assistant will be Joseph F. Weller of Rochester, vice president of the George W. Kellogg Co., manufacturers of automobile accessories and parts.

John J. Davison has taken a position as general superintendent of the Hart & Crouse Heater Co., Utica, N. Y.

Andrew Carnegie, who has passed the summer at Shadowbrook, Lenox, Mass., plans to return to New York, Nov. 1.

A. E. Blazo has been transferred from the Boston office of Rogers, Brown & Co., to the Philadelphia office of that company.

Fred O. Thompson and William W. Eells have retired from the Thompson Mfg. Co., Worcester, Mass., wire goods, and the business will be taken over by Clarence B. Benedict, Boston.

M. A. Cahen, salesman for the firm of Young, Corley & Dolan, 115 Broadway, New York, machine tool dealers, has been summoned for military service at Camp Dix, Wrightstown, N. J.

George H. Turvielle, secretary and treasurer of the Crucible Steel Co. of America, also has been made vice president. J. M. McComb, credit manager, has become assistant treasurer.

Charles E. Billings, president, since 1869, of the Billings & Spencer Co., Hartford, Conn., has retired, at the age of 82 years. He is succeeded by Frederick C. Billings, for many years vice president of the company.

C. B. DUNSTER,
Who has been made manager of E. W. Breitung & Co. at Cleveland

Frederick Eames Cooper, scientific manager for the Wire Goods Co., Worcester, Mass., has been commissioned a first lieutenant in the ordnance reserve of the United States army.

C. E. Jenkins, Allentown, Pa., formerly engineer of maintenance of way for the Lehigh Valley Transit Co., has been appointed construction engineer at the Traylor Shipbuilding Co.'s plant at Cornwells, Pa.

E. L. Hershey, superintendent, and J. Williams, assistant, have been in charge of the work of rehabilitating the old Irondale furnace at Irondale, Wash., now the property of the Pacific Coast Steel Co., San Francisco.

H. B. Pulsifer, formerly a member of the faculty of Armour Institute of Technology, Chicago, has been named professor of metallurgy of the Montana State School of Mines, Butte, Mont.

W. K. Hart Jr., Midland, Pa., who has been engaged in the real estate business for some time past, has been appointed manager of the Midland Improvement Co., and the Midland Water Co., Midland, Pa. Mr. Hart succeeds W. C. Rice who, resigned.

A. H. Hudson, formerly director of purchases of the Wright-Martin Aircraft Corp. and the Simplex Automobile Co., both of New Brunswick, N. J., has been appointed purchasing agent of the American International Steel Corp., 120 Broadway, New York.

James H. Morris, auditor's department of the Brier Hill Steel Co., has joined the auditing department of the Inland Steel Co., Chicago. Mr. Morris was connected with the Inland Steel Co. several years ago. Subsequently he was auditor of the William Tod Co., Youngstown, O.

William B. Curtis, for some time assistant sales manager of the conduit department of the Youngstown Sheet & Tube Co., Youngstown, O., has been ordered to report at Washington, following his appointment as a lieutenant in the ordnance department of the officers' reserve corps.

Harry G. Fawcett has resigned as advertising manager of the Chain Belt Co., Milwaukee, to become associated with Chester M. Burdick, 534 Wells building, Milwaukee, advertising. He succeeds Charles E. McCreedy, who has gone to France as a member of the American field service.

John E. Woods, for 12 years manager of sales of the Carnegie Steel Co., at Cincinnati, has been transferred to the Pittsburgh offices as assistant sales manager and succeeds the late John W. Dix as head of the structural bureau. Mr. Woods has assumed charge of the new position to which he has been promoted. He will be succeeded by J. G. Caruthers, who

has been assistant manager of sales at Cincinnati for several years.

J. J. Nordman, who has been secretary of the Pittsburgh Export Co., Pittsburgh, and of the foreign trade commission of Pittsburgh, has withdrawn from both organizations to act as American purchasing representative for foreign account under the trade name of J. J. Nordman & Co., Farmers Bank building, Pittsburgh.

Morris Metcalf, formerly vice president of the Simplex Automobile Co., New Brunswick, N. J., and before that with the Illinois Steel Co., and later with the Universal Portland Cement Co., has been elected vice president of the American International Steel Corp., 120 Broadway, New York, which recently was organized as a subsidiary of the American International Corp.

D. S. Guthrie, manager of the steel department of the Federal Export Corp., New York, and vice president of the Commercial Iron & Steel Corp., a subsidiary of the former, has been named a vice president of the parent company. S. A. Benner, who resigned from the American Steel Export Co., New York, likewise has been made a vice president of the Federal Export Corp.

Frank W. Brooke, formerly connected with the John A. Crowley Co., Detroit, and later in the metallurgical department of the Ludlum Steel Co., Watervliet, N. Y., has become a director of the Electric Furnace Construction Co., Philadelphia. Mr. Brooke will superintendent the construction and operation of Greaves-Etchells furnaces in this country. He will be assisted by G. W. Ketter, who has installed numerous electric furnaces now in operation, and has just completed the installation of 10 furnaces for the British Forgings Co., Toronto.

H. W. Haggerty has been made general manager of sales of Corrigan, McKinney & Co., Cleveland, O.; A. J. Sweeney, general manager of transportation; H. T. Harrison, general manager of the company; P. H. Owen, purchasing agent; and F. T. McCrackin, manager of the shipping department. Mr. Harrison, who was formerly chief engineer of the company, has been succeeded in this position by J. Y. Blackwood. These appointments are for the purpose of centralizing authority in the different departments of the company's business.

P. J. Moran has been appointed general manager of blast furnaces for M. A. Hanna & Co., Cleveland, succeeding Max McMurray, who has become president of the Cromwell Steel Co. Mr. Moran has been general superintendent of the Detroit Iron & Steel Co., a Hanna interest. Before that he was superintendent of the blast furnaces of the United Iron & Steel Co., Leetonia, O., which later was taken over by Hanna & Co. Previous to that Mr. Moran had been superintendent of blast furnaces with the Republic Iron & Steel Co., Youngstown, O.

J. Arthur House, first vice president of the Guardian Savings & Trust Co., Cleveland, has resigned to become associated with M. A. Hanna & Co. in the financial department, effective Oct. 1.

Algoma Steel is Building New Blast Furnace

Toronto, Sept. 24.—The Algoma Steel Corp. is erecting another blast furnace which will have a capacity of 400 tons of pig iron daily. It is expected to be ready by the new year. The company recently completed an open-hearth furnace, making the tenth now in operation, with a capacity of about 200 tons per day. Duplexing which is being carried on with some of the equipment has been producing very satisfactory results. Work on hand is at present confined to the manufacture of 4.5 and 6-inch shells, large contracts for which will keep the plant busy for some months.

The Canadian government has passed an order in council prohibiting the exportation of steel rails from Canada except to Great Britain and British possessions.

Ornamental Manufacturers Alter Meeting Plan

After deciding to hold semi-annual instead of annual sessions, the National Association of Ornamental Iron and Bronze Manufacturers at their annual meeting in Chicago chose Cleveland for the first midyear session in March or April, 1918. The meeting was held at the Hotel Sherman, Sept. 19 and 20. Officers were re-elected as follows: H. H. Suydam of the Cincinnati Mfg. Co., president; E. F. Lasar of the Lasar Mfg. Co., St. Louis, vice president; Fred J. Meyers of the F. J. Meyers Mfg. Co., Hamilton, O., treasurer; Charles F. Waltz, Cincinnati, O., commissioner. These officers compose the administrative council with W. B. Rix, Chicago; F. H. Howe, Columbus, O.; F. P. Smith, Chicago, and W. Hume Logan, Louisville.

F. P. Smith of the F. P. Smith Wire & Iron Works, Chicago, presented the principal paper on the effect of war on estimating costs. The main object of the association is to avoid mistakes in handling costs and overhead, to assure profitable bidding instead of methods leading to loss. Wages and labor conditions were discussed by E. F. Lasar, how to increase membership by Theodore R. Tiesler, "Co-operation" by C. Zimmerman, "Looking Ahead" by Frank H. Howe, and railroad embargoes and freight rates by F. Grimm.

Begin Removal of Blast Furnace to India

Birmingham, Ala., Sept. 25.—Work of removing the old Battelle, Ala., blast furnace to India will be inaugurated the latter part of this week, the Alabama Great Southern railroad having just installed a side track to the plant for this purpose. Several hundred cars will be used in moving the furnace and appurtenances from Battelle to Mobile. There the equipment will be loaded on boats and tows bound for Sakchi, India, and the plant of the Tata Iron & Steel Co., the purchaser. James Crawford of the Crawford-Vaughan Boiler & Locomotive Works, Birmingham, contractors in the taking down of the furnace, is at Battelle preparing the first shipment, which will consist of several cars of parts. The work of removing the furnace is to be rushed. The furnace will be re-erected at the plant of the Tata company, in India, where Temple Tutwiler, son of Major E. M. Tutwiler of Birmingham, Ala., is in charge.

Foresees Pacific Works

Construction of an extensive steel works on the Pacific coast in the not distant future was predicted by B. L. Thane of the Alaska Gastineau Mining Co. at a luncheon given recently in his honor by the Seattle Chamber of Commerce and Commercial club. The Thane Co., of which Mr. Thane is the head, has been making a thorough investigation of the iron and coal resources of the Pacific coast to ascertain whether proper and sufficient raw materials are available for a steel works. He stated that the company's engineers have determined that certain coal deposits of Washington will produce the requisite quality of by-product coke for blast furnaces and that sufficient iron ore of the necessary character is available along the coast. Tungsten, chrome, molybdenum and other tool steel materials are available in Washington. The demand for plates, angles, shapes, billets, etc., which has developed on the Pacific coast during the past four years commercially justifies the building of a steel plant, says Mr. Thane.

Commission Favored Radical Action

Pig Iron Price of Less Than $25, Corresponding Action in Steel Products and Abrogation of Contracts Indorsed by Members of Federal Trade Commission Before Committee Hearing on Pomerene Bill

WASHINGTON, Sept. 25. — President Wilson apparently has dealt more liberally with the iron and steel industry in the matter of prices than the federal trade commission has been inclined to do. This is the clear impression which was given by members of the commission when they and their experts aired their opinions as to what ought to be done to the iron and steel industry, before the senate committee on interstate commerce last week at the hearings on the Pomerene bill. This measure would empower the government to take over the industry from mine to mill. Pig iron at less than $25 and abrogation of contracts now on producers' books were favored by representatives of the commission who appeared at the hearing.

The attitude of the commission, disclosed by Commissioners Davies and Murdock and Dr. Francis Walker, a costs expert of the commission, was that of a prosecutor, a position which it has maintained not only toward the steel trade, but toward the coal, paper and another industries as well. The tone of Mr. Davies and Dr. Walker's voices indicated clearly their prejudice. Mr. Davies said his commission was to get facts for the government, but from the way the figures of the commission were given the committee it appears to be a debatable question.

Wanted Iron Contracts Annulled

Mr. Davies declared abrogation of present pig iron contracts is the only way a price fixed by the government will be equitable. He declared that so much pig iron is under contract—he didn't give any figures—that a universal price will help only a few pig iron consumers. He said contracts for 75 to 85 per cent of the coal supply of the country, made before the President named the coal prices, left so little spot coal that the general public is not likely to get much relief this winter. He declared abrogation is necessary in this instance, too.

The commission is going to give the senate committee a written statement of its views on how contracts can be canceled without violating the American constitution. Mr. Davies and Mr. Murdock told the committee it can be done and said the Pomerene bill would fail in its purpose unless it adequately provided for this point. The trade commission is in favor of a flat price on pig iron at a figure less than $25 a ton. What its real price would be was not disclosed, but both Mr. Davies and Dr. Walker declared $25 per ton would allow very fair profits. This was the only price they discussed, but they gave some figures to show the cost of producing ore, coke, pig iron, billets, and plates and shapes.

Makes Cost Statements

Companies as fully integrated as the United States Steel Corp. were producing pig iron in May and June this year at $13.62 per ton, Commissioner Davies said. This cost, he declared, is only $2.47 more per ton than in May, 1916, and is not very much, if any, greater at the present time. And companies which must buy their ore and their coke, he said, can produce pig iron at approximately $21 a ton, $5 higher than a year ago. As to plates and shapes, he said, such makers as the Steel Corporation can roll them at an average price now of approximately $34.56 per ton as against $27.44 a year ago. Allowing $5 more for inter-company profits, the Corporation can produce them at a cost of not more than $40.

The increase in the cost of every basic and finished steel product has not been as great as the increase in the market price, Mr. Davies declared. The greatest factor in the price increase is the keen bidding of buyers of even the smallest tonnages. The labor increase has been only a slight factor, he said.

"Every time the United States Steel Corporation gives its employes a 10 per cent increase, it adds only $1.50 to the cost of making steel," Mr. Davies testified. On this basis, the four increases the companies has made since the world war began, including the 10 per cent effective Oct. 1, the Corporation has added only $6 per ton to its costs. This increase in wages, however, makes practically 45 per cent since the war began.

Mr. Davies said the price for iron ore from 1895 to 1911 varied from $2.40, lowest, to $4, highest, and that now a ton can be purchased for $5. Coke, he said, sold at as low as $1.40 to as high as $6 a ton in the 14 years to 1911 and that now it sells at from $6 to $16, and coke can be produced at less than $5 a ton and ore at the mine costs $1.23. Tank plates in 1914 sold at $1.05 to $1.20 per 100 pounds and now sell at $7 to $8, he testified. Steel plates in 1914, according to the commissioner, sold at $1.60 to $2.40 per 100 pounds and now sell at close to $11 and some, he said, even went as high as $17. The cost of making plates, he declared, isn't over $40 to $45. Companies which produce plates at $40 and sell them at $160 make approximately 100 per cent on the transaction. He pointed out, however, that that is not true of every transaction.

As to the Pomerene bill itself, it is the opinion of some members of congress and many steel men that the bill will not pass congress this session. There wasn't a steel man present at the hearing, nor were any consumers of steel, men whom Senator Pomerene said the bill was designed to benefit. It might be noted that the measure, introduced August 8, didnt get its first hearing until Sept. 21, and that of 17 members of the committee only four attended the hearing, Senators Newlands, Pomerene, Cummins and Kellogg. After the one-day sesion the committee adjourned, subject to the call of the chair and to receive from the trade commission the remarkable document it is to prepare and tables showing output and market prices of various steel commodities covering a period of years.

Will Study Occupational Fitness of New Army

Washington, Sept. 25.—Further shortage of labor soon is seen in the announcement of the war department that experts now are engaged in making a survey of the men in the new national army as to their occupational and educational fitness for specialized military work. This is taken generally as the forerunner of a call by the President for an additional 200,000 men to take the places of those who are to be assigned to this special work. Up to the middle of last week congress had been working on appropriations for an army of 2,033,345 men, exclusive of 86,158 officers, but Secretary Baker asked the senate finance committee for $287,416,000 more than is authorized in the war expenditures bill which passed the house last week with appropriations aggregating $7,023,-

786,130. With this request went a letter explaining it as to provide for additions to equip and maintain an army of 2,300,000 men.

These appropriations are for the fiscal year ending June 30, 1918, and are on the basis of an army of 2,033,345 men for one year. But as that number will not be under arms a full year and as the new number of 2,300,000 will be under arms less time than the smaller number, it is expected the government contemplates the call of at least 700,000 more men before another six month goes by.

The object of the survey is to find men especially fit for such special work as will be required in the signal corps, particularly in the aviation section, in the ordnance corps, etc. At least 110,000 men will be required in aviation service. The survey is being made in each of the 16 cantonments by a "committee on classification of personnel in the army." The committees are composed of employment managers, psychologists, etc., who will report to the division commanders. The commanders will make the transfers.

Military Truck Designs Approved for Army

Washington, Sept. 25.—Rapidity of manufacture and stability under war usage are the principal features possessed by the designs of military trucks approved by the war department. It is expected the first truck will be ready for war tests shortly after Oct. 1. Parts now are being manufactured. Deliveries are expected to begin in January.

Announcement of this new truck was made by Secretary Baker last Saturday. Like the new standardized motor for American airplanes, the truck has taken a very short time for development by American engineers and manufacturers.

Christian Girl has resigned as president of the Standard Parts Co., Cleveland, Secretary Baker says, and will directly supervise the manufacture of the new truck. He will work under Col. Chauncey M. Baker, of the quartermaster's corps, in charge of transportation, and the reorganized automotive products committee of the war industries board. Members of the committee are: H. L. Horning, representing tractor interests; C. W. Stiger, Motor and Accessory association; Coker F. Clarkson, Society of Automotive Engineers; Frank W. Russell, Aircraft Manufacturers' association; T. W. Henderson, representing motorcycle manufacturers; Henry R. Sutphen, watercraft manufacturers; Hugh Frayne, war industries board, representing labor, and Colonel Baker. This committee will serve under Robert S. Brookings, in charge of the finished products division of the war industries board. It will have advisory supervision on all matters involving the use of internal combustion engines, including the production of motor cars, trucks, ambulances, tractors, power boats, and airplane engines with subcommittees on priority, gasoline and military motorcycles.

Under this organization 15,000 of the new trucks are expected to be delivered to the war department in the first six months of 1918. Of these 10,000 will have a normal capacity of from 1½ to 3 tons, and 5000 from 3 to 5 tons. The engines will be the same except for slight differences in cylinder bore, pistons, piston parts, and riggings. Most of these parts will be interchangeable.

More Deals in Kentucky Coking Coal Closed

Whitesburg, Ky., Sept. 24.—Another important coking coal land deal, involving over 10,000 acres, along Troublesome Creek in Perry county, has been concluded by A. C. Rhinehart and others of New York. Announcement is made that a large part of the property will be developed and a new town of several thousand people will be established. It is said upon reliable authority that the United States Steel Corp. will control the output of the coke for which the coal will be used. According to the announcement, the development work will be well under way within 60 days. At least ten mines will be opened which, when fully under way, will have a capacity of at least 10,000 tons daily, it is stated. The product will be shipped to some designated point for coking.

A number of steel and iron companies are coming to this section for their coking coal supply. In the headwaters of the Cumberland river section the United States Coal & Coke Co. is erecting a modern plant and developing 20,000 acres of Looney Creek property, carrying a 14-foot vein of solid coal. This output will be taken exclusively by the United States Steel Corp. on the long-time contracts. Tee Ell is the name of the modern new town now being built.

Another coking coal company soon to begin operations is the Detroit-Elkhorn Coal Co., which will develop 2500 acres on the headwaters of the Kentucky river in Letches county. In the Marrowbone field of Pike county the Edgewater Coal & Coke Co. and the U. S. Solvay Coal & Coke Co. are planning new developments around Hellier, which for years has been noted as a coke manufacturing town.

Connecting Span

Of Great Quebec Bridge Finally Put In Place Without Disaster

Toronto, Sept. 24.—The work of hoisting into position the central span of the Quebec Bridge of the Transcontinental Railway over the St. Lawrence river, which was commenced Sept. 17 was successfully concluded on Sept. 20, when the connecting structure was bolted to the two cantilever arms. The span, 640 feet in length and weighing 5540 tons, was towed on pontoons from Sillery where it was constructed, and was raised by eight hydraulic jacks having rams 22 inches in diameter and a working pressure of 4000 pounds to the square inch. The span was hoisted 2 feet at a time. The hydraulic pumps were operated by compressed air. Long mooring frames were suspended from each of the cantilevers calculated to bear a strain of 300,000 pounds to the square inch, and huge pins were inserted into the frames at every two feet to sustain the structure until the next lift. Much anxiety was felt during the operation, in view of the disasters attending previous attempts to complete the bridge, but owing to the great caution exercised the work was safely accomplished. The raising of the span into position was celebrated by the ringing of church bells and the hoisting of flags.

It will be some months before the bridge is ready for the passage of trains. The painting of the structure will occupy about three years. When complete, the bridge will shorten the railway trip between Halifax and Winnipeg by half a day. The cost of the bridge will be between $18,000,000 and $20,000,000. Its total length is 3239 feet, and the distance between the piers on which the cantilevers rest is 1800 feet. The height of the central span above the water is 150 feet. Each of the cantilever arms is 562 feet in length and the total weight of steel, when everything is in place, will be about 65,000 tons.

The building of the bridge was commenced in 1906. The design then adopted provided for the extension of the cantilever arms until they met in the middle. In 1907 one of the arms collapsed, causing a loss of 70 lives. A new design then was adopted with a central span to be floated on pontoons and hoisted into position. The first attempt to carry out this plan resulted disastrously last year, when the hoisting apparatus broke and the span fell into the river, with a loss of 14 lives. The financial loss entailed by these catastrophes was about $8,500,000.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted for Busy Readers

Acceptances Grow in Iron and Steel

WITH the government at present the largest customer for iron and steel, an excellent opportunity for the extension of trade acceptance business in that industry has arisen. Reports indicate that this is what is in contemplation by the managers of the federal reserve system, and it seems evident that the campaign carried on by these banking authorities will receive favorable treatment by the trade. The federal reserve board recently made a survey of the acceptance business now being done throughout the country and it was found that it is slowly on the increase. It is an interesting fact that the new method of handling trade credits has increased more rapidly in the iron and steel districts than in any other.

Federal reserve authorities reported that the acceptance liabilities of national banks in Cleveland totaled $70,000 on March 5, 1917; $270,000 on May 1, 1917; and $1,494,000 an June 20, 1917, which is the last date for which official reports were obtained. The proportionate increase in the acceptance liabilities of national banks in that city was greater during the period in question than the gain in New York City, Boston or Chicago. The acceptance business in Philadelphia, as a matter of fact, showed but a slight increase during the period. The increase in Cincinnati was on a par with that in Cleveland. The acceptance liabilities of national banks in Cincinnati on March 5 were given as $22,000; on May 1, $23,000, and on June 20, $1,578,000. No tabulation was reported for Pittsburgh, but that of Cleveland, it is fair to assume, was typical of the business done in Pittsburgh.

National Banks Gain Heavily

During the period between March 5 and June 20, 1917, the liabilities of national banks on account of acceptances increased from $101,485,000 to $144,414,000, or $42,929,000, the greater proportion of the increase, or $33,865,000, developing between May 1 and June 20. These figures include only the acceptance business of the national banks as reported to the comptroller of the currency in Washington. No figures are available for the acceptance business done by other member banks of the reserve system. The reports show clearly that for the first time Cleveland and Cincinnati are carrying acceptances of considerable volume, which have arisen from the businesses peculiar to these localities.

There are evidently several reasons why the acceptance business of the banks has increased, thereby indicating a gradual change in the method of meeting credits growing out of the iron and steel industry. One is found in the money situation which was concisely reported by the reserve agent at Cleveland. Speaking of the business done in August in this reserve district which includes Pittsburgh, this agent said:

"While collections in some parts of this district are reported as improved over last month, yet most of our correspondents report slower payments. Many of the larger companies state that their collections are coming in considerably behind the estimate for the month. There is a continued active demand for loans throughout the district, and the rates are steady at 5½ and 6 per cent for both time and demand paper. Banks seem to be fully taking care of customers, but it is a lender's market."

If the acceptance business, which American industries now are being urged by the federal reserve board to adopt, affords a more liquid plan of handling credits, it would seem that this is a natural method of meeting the present situation prevailing in a money market, such as that described. To speed up the iron and steel output, requires more money and ready money. Therefore, it is logical that the industry should consider the acceptance as a method of meeting such a need. The advisability of this change has become more apparent since the federal reserve board has issued its informal ruling to the effect that domestic bankers' acceptances may be drawn against shipments of goods from a corporation to its agent. The member banks now are ready to act in accordance with that ruling. Inasmuch as it gives a most concise statement of the method of handling the business, it is pertinent to call attention to the main substance of the ruling, from which it can be readily seen how this applies to the iron and steel industry. The board stated:

"The federal reserve act authorizes any member bank to accept drafts or bills of exchange which grew out of transactions involving the domestic shipment of goods, provided that shipping documents conveying or securing title are attached at the time of acceptance and and provide further that such drafts or bills of exchange have a maturity of not more than six months' sight to run, exclusive of days of grace. It is the opinion of the board, however, that although the act fixes a maximum maturity of six months, nevertheless, in any case where a draft is drawn against the shipment of goods, in a transaction which does not involve the sale of these goods, the maturity of the draft should approximate the duration of their transit. In such a case the law contemplates that the acceptance of the draft should be for the purpose of financing the shipment and that it should not be the means of furnishing a credit for any other purpose.

"A slightly different situation arises, however, in the case where a draft is drawn against the shipment of goods in a transaction involving the sale of these goods, because in that case the draft may properly be drawn and accepted for the purpose of financing not merely the shipment, but also the sale of the goods. The maturity of the draft need not necessarily approximate the length of time involved in the shipment in such a case, though it must be limited to a maximum of six months, exclusive of days of grace."

Use Acceptances in Pig Iron

Where a transaction in the business cannot be covered by a domestic acceptance, it is possible to substitute a trade acceptance, which is, in other words, nothing more than two-name paper. Such a trade acceptance, reserve bank officials urge, is a much

handier method of handling credits than the present "open account," or "cash discount." The cash discount is merely one where the purchaser borrows from his bank to make the "cash" payment. The federal reserve board has issued an appeal to business men to substitute the trade acceptance for this "cash discount" business and it now appears that the industry is ready to listen to this advice. It has been observed, for instance, that several sizable transactions involving sales of pig iron in the Pittsburgh district recently were made with trade acceptances as the medium of exchange.

A recent appeal of the board declares:

"The problem must be solved by the business man rather than the banker. What is required is that each trade find a solution which will be suited to its own requirements. It appears to the board that between the cash-discount and the open-account sale there should be room for a special discount for sales against trade acceptances and that this discount should approach very nearly the discount granted for cash sales. If business men will attack the problem from this angle and the banks will lend their aid by granting preferential rates for trade acceptances the problem can be worked out. A solution will be a gain for the United States inasmuch as it will contribute to the healthy development and greater strength of our banking structure. Acceptances, in order to fulfill their most important mission, must be representative of the best mercantile credit: otherwise they will necessarily come to occupy a secondary position as the embodiment of the less fluid elements of the country's business. There appears to be a mistaken supposition in some quarters that the mere conversion of the 'open account' into a trade acceptance renders the underlying credit better than, or preferable to, the unsecured account. The board has never contended that the use of the trade acceptance, as such, could alter the character of the credit underlying it, but only that the acceptance method, involving as it did, the creation of paper protected by two names, rendred the paper more secure and more readily salable than it otherwise would be. The essential question is, however, in all cases the character of the underlying credit itself, a question which the local banker is in the best position to answer."

Witherbee Sherman Elect

Witherbee, Sherman & Co., Inc., 2 Rector street, New York, announce that, pursuant to action of the board of directors at a meeting held Aug. 20, the officers of the company are as follows: Chairman, Walter C. Witherbee, Port Henry, N. Y.; president, Lewis W. Francis, New York; vice president, E. A. S. Clarke, New York; vice president and general manager, George C. Foote, Port Henry; treasurer, Silas H. Witherbee, Port Henry; secretary, Ralph E. Rogers, New York. These changes have been brought about by reason of the recent death of Frank S. Witherbee, president of the company.

Thomas Has Big Sales

A surplus of $184,873 after the deduction of interest, discount and dividends amounting to $104,898, is shown in a statement of the Thomas Iron Co., Easton, Pa., for the current year. Gross sales for the year aggregated $2,837,433, while gross profits amounted to $85,071. Income from other sources totaled $204,699, making a gross income of $289,770. The old board of directors was re-elected. The directorate consists of the following men: Walter A. Barrows Jr., Fred R. Drake, J. Samuel Krause, Edwin Thomas, Andrew D. Chidsey and J. Mark Hauser. Following the re-election of the board, the body chose the following officers: President, Walter A. Barrows Jr.; vice president, Fred R. Drake; secretary, Oliver T. Case, and treasurer, L. K. Diefenderfer.

Vote to Dissolve

Stockholders of Milliken Bros., Inc., at a special meeting in Richmond, Va., Sept. 20, unanimously voted to dissolve the corporation in accordance with the recommendation of the board of directors. The plant of the company on Staten Island, as recently reported, was sold to the Downey Shipbuilding Corp., which is converting it into a shipyard. Directors of Milliken Bros. Co. have declared a distribution of $10 a share, the first move in the plan of dissolution. A dividend is payable Oct. 1 to holders of record Sept. 25.

Financial Crop Ends

Increased production has brought with it a demand for greater manufacturing facilities; while the difficulty with which raw materials now are obtained has made necessary the purchasing and storing of larger stocks than heretofore. These conditions have caused many companies to increase their capital stock. Some of the more recent increases in capitalization follows: The Novo Engine Co., Lansing, Mich., from $112,000 to $675,000; the Gas Oil Stove Co., Detroit, from $100,000 to $200,000; the Western Brass Mfg. Works, Chicago, from $50,000 to $200,000; the Security Tool Works, Chicago, from $10,000 to $20,000; the Youngstown Pattern Co., Youngstown, O., from $20,000 to $30,000; the Smiley Steel Co., New York, from $5000 to $50,000; the Old Reliable Motor Truck Corp., New York, from $15,000 to $200,000; the Buffalo Foundry & Machine Co., Buffalo, from $500,000 to $1,500,000; the Reliance Airbrake Co., Buffalo, $200,000 to $450,000, and the Fort Smith Metal Products Co., Fort Smith, Ark., from $50,000 to $100,000.

* * *

Harris-Silvers-Baker, Inc., which recently erected a new structural steel fabricating plant at Newmarket, N. J., has changed its name to the Harris Structural Steel Co., Inc.

* * *

The Eagles Sales Co., Inc., Bridgeport, Conn., has acquired the interest of C. E. Van Riper in the Eagles Sales Co. and in the United States Airplane & Engine Co., both of that city, besides his interest in a mechanical device.

* * *

The North Dighton Stove Co., Taunton, Mass., which recently was incorporated with $40,800 capital, is under management of the following men: President, Daniel Crotty; secretary, Henry H. Lincoln, and treassurer, John P. Drary.

* * *

Income of the Gulf States Steel Co., Birmingham, Ala., which was derived from plant operation totaled $444,747 during August. This is an increase of $186,153 over the corresponding month of 1916 and is the record month for the company.

* * *

A mortgage of $2,500,000 against the mine of the Webb Iron Co., near Hibbing, Mich., has been paid off by the Shenango Furnace Co., W. P. Snyder, president. Bonds for the amount of the mortgage were issued in 1910 and were taken up by the Pittsburgh Trust Co.

* * *

Directors of the Interlake Steamship Co., Cleveland, recently voted to redeem $1,500,000 of the company's bonds, Nov. 1, in advance of maturity. These bonds, which were issued May 1, 1913, are being recalled in inverse order of maturity and are to be redeemed at 105.

* * *

The Wire Wheel Corp. of America has made an offer to preferred shareholders of the Hendee Mfg. Co., Springfield, Mass., to exchange one share of preferred and one share of common stock of the Wire Wheel Corp. for one share of Hendee Mfg. Co. stock.

* * *

First and collateral trust 6 per cent bonds, valued at $75,000, will be retired by the Struthers Furnace Co., Struthers, O., and its subsidiary, the Struthers Coal & Coke Co. Of this amount $50,000 will be retired in advance of maturity. A bond issue of $1,000,000 was authorized Oct. 2, 1911, of which $750,000 was issued, payable semiannually at the rate of $25,000. Owing to the advance retirement only $400,000 in bonds will be left outstanding on Oct. 1. The company resumed payment on its $1,000,000 capital stock at the rate of 10 per cent last October.

Shipbuilders Buoy Up Crane Market

Electric Crane Demand Grows Rapidly—Private Buyers Likely to Enter Machine Tool Market Owing to Recent Steel-Price Decision—Airplane Parts Maker in Detroit District Places $200,000 Order for Equipment

FURTHER large contracts for guns, gun mounts and other munitions have been placed by the government the past week. The Minneapolis Steel & Machinery Co., Minneapolis, has received an order for gun mounts which will keep its plants operating at capacity night and day through 1918, at least. Manning, Maxwell & Moore, New York, have the contract for supplying the equipment for this work. The Tioga Iron & Steel Co., Philadelphia, is buying machine tools for its new gun machining plant. The Tacony Ordnance Co., Philadelphia, has closed for practically all the equipment it will require for its new gun shops. The Crucible Steel Co., Pittsburgh, which has not been active in the machinery market recently, now is figuring in New York for some heavy equipment. The Bridgeport Projectile Co., Bridgeport, Conn., is reported to have received an additional order for shells from the United States government.

Much interest continues to be displayed in the development of the airplane industry. Manning, Maxwell & Moore have about completed purchases of machinery for the new plant of the Curtiss Aeroplane & Motors Corp., at Buffalo, and now is buying supplies for the use of this company to the end of 1918. The new plant is 900 x 1300 feet and is the eighth plant of the Curtiss company. The tool requirements of the General Vehicle Co., Long Island City, and the Simplex Automobile Co., New Brunswick, N. J., for airplane engine work, still are being held up, probably pending completion of arrangements at Washington. It now develops that the list of tools bought by the J. G. White Engineering Corp., 43 Exchange place, New York, recently, was not for a plant to build Liberty motors in France, as had been generally thought in the trade, but for other airplane engine work in France. Various well equipped automobile companies in this country will receive contracts for making parts of the "Liberty" motor.

Shipbuilders Inquire for Cranes

Shipbuilders still are furnishing the crane and machinery markets with a full quota of interest. The Fore River Shipbuilding Co. is inquiring for thirty 5-ton and ten 10-ton traveling cranes for its new destroyer shop. The American International Corp., 120 Broadway, New York, is expected to issue a list of cranes for its new plant at Hog Island, Pa., within the next week. It is understood this company will establish an office at Philadelphia through which it will conduct its buying. The Federal Shipbuilding Co., whose proposed yard at Newark Bay was expected to develop a long list of cranes shortly, now is understood to be obtaining its cranes from the American Bridge Co., sister subsidiary of the United States Steel Corp. William Cramp & Sons Ship & Engine Building Co. is inquiring for two 22-ton hammerhead cranes. The Merchant Shipbuilding Co., Philadelphia, is negotiating for a list of punching, shearing and other shipyard machinery for its new plant at Bristol, Pa. The Stone & Webster Engineering Corp., 147 Milk street, Boston, has issued an inquiry for a 6-motor, 90-ton, double trolley traveling crane for the Philadelphia Electric Co. The Stone & Webster Engineering Corp. also is inquiring for a 2000-ton single stand forging hammer and a 150-ton hammer. The Cleveland Punch & Shear Works, Cleveland, has closed an order through Charles Haas, 50 East Forty-second street, for punches and radial drills for a dumpcar plant in France. The Pennsylvania railroad has just issued an inquiry for a 5-ton traveling crane. W. G. Cornell & Co., New York, is inquiring for pipe-threading and cutting machines.

Dealers' Activities Depend on Small Inquiries

SPECTACULAR happenings in the machinery market noticeably are absent at present. A lull is noted by some sellers, government buying apparently having paused while other users are not in the market for large needs. In spite of the fact that business apparently is slack, sales total well. The aggregate of the small sales being made perhaps equals the sum of the few larger transactions previously which were more impressive. Deliveries on tools are being extended and few orders can be promised short of January of next year. Producers in many lines cannot offer delivery until October to December of next year. This applies especially to heavier tools which have experienced a large demand of late. Railroads seem to find conditions unpropitious for buying and have not been in the market except for occasional single tools. Plants holding government contracts have bought heavily but have not come out recently for additional equipment. General expansion in the industrial line continues and all over the west new plants and additions are being built. The Inter-Ocean Refining Co. will erect a plant on a 40-acre tract at McCook, Ill. The Apex Electric Mfg. Co., Chicago, will build a plant. The Hartman-Greiling Co., Green Bay, Wis., is building a plant to lease to the Lawson Aircraft Corp. The Marine Pipe & Machine Works, Seattle, is building a plant for the manufacture of oil-driven marine engines. The Paterson MacDonald Co., Seattle, is building a machine shop. The Union Iron Works, San Francisco, is building a large machine shop at Oakland. The Davis Mfg. Co., Enid, Okla., is building a machine shop. The Weaver Mfg. Co., Springfield, Ill., is building an addition for the manufacture of automobile specialties. The Southern Illinois Machine & Foundry Co., Murphysboro, Ill., is building a foundry and forge shop addition. The Lansing Forge Co., Lansing, Mich., is equipping a plant recently acquired. The Fort Smith Metal Products Co., Fort Smith, Ark., is equipping an addition for the manufacture of beds and automobile accessories.

Private Buyers Await Better Deliveries

MACHINERY and machine tool interests in the Pittsburgh district report that private business continues to be practically at a standstill. The manufacturers are well booked, however, with require-

"AGATHON" Chrome Nickel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steels
"AGATHON" Special Analyses
"AGATHON" Vanadium
"AGATHON" Chrome Steel
"AGATHON" High Carbon

Manufactured Only By

THE CENTRAL STEEL COMPANY
Massillon, Ohio

Branch Offices:

DETROIT OFFICE: 326-327-328 Ford Building,
F. Walter Guibert, District Representative.

CLEVELAND OFFICE: Hickox Building,
The Hamill-Hickox Company, District Representative.

CHICAGO OFFICE: 1370 Peoples' Gas Building,
112 So. Michigan Blvd.
A. Shaeffer, District Sales Manager.

PHILADELPHIA OFFICE: 603 Widener Building,
Frank Wallace, District Sales Manager.

J. E. DOCKENDORFF & CO., 20 Broad Street,
New York, General Export Agents.

Will Serve Your Purpose Best

ments both for domestic and government use, and are not eager for new contracts. It is evident that a great amount of private buying is ready to develop as quickly as the state of the trade becomes more certain. At present many requirements are not being placed because of delayed deliveries. Private consumers are also withholding purchases in the belief that cost will be reduced when the government fixes prices on steel products. Manufacturers doubt this seriously. The chief item of cost, it has been pointed out, is labor, and there is, of course, no prospect of this being reduced.

Cleveland Dealer Closes Big Contract

CONSPICUOUS in the Cleveland machine tool market is the report of the consummation of a $200,000 contract by a local dealer for equipment to be installed in an airplane-parts plant in the Detroit district. Multiple spindle boring mills predominate in the list of machine tools specified in the contract. Optimism pervades the market in respect to the early opening of a well-rounded buying movement on the part of private buyers who have been forced to hold off for some time owing to the priority which has been given to government work. Automobile makers almost have become a nonentity in so far as the frequency and size of their inquiries have been concerned, several dealers report. The demand for heavy tools has continued without diminution and dealers are experiencing the same difficulty as heretofore in obtaining tools of this type. During the past week an easing up in the demand for heavy lathes has been observed. No changes in prices have been made during the past week. Inquiries for drill presses, radial drills, milling machines and shapers have predominated during the past week. The West Steel Casting Co., Cleveland, is in the market for a slab milling machine. The Heppenstall Forge & Knife Co., Pittsburgh, has issued an inquiry for a 36 or 42-inch, double-head, vertical boring mill. An inquiry has been received from the O. O. Poorman Co., New Bremen, O., for a 48 or 60-inch gear cutter. The Smalley-General Co., Bay City, Mich., is in the market for small tools. Quotations on various machine tools are desired by the Sandusky Forge Co., Sandusky, O. Plans have been made by the Benoist Aeroplane Co., Sandusky, O., to remove its plant to Canton, O. The A. P. Schraner Pattern Works, Cleveland, has purchased a site and will erect a two-story plant to cost approximately $50,000.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

AUBURN, ME.—The Cushman-Hollis Shoe Co. has let the contract for a brick, 1-story, 48 x 131-foot addition to its factory on Union street to cost $20,000.

PORTLAND, ME. — The United States Shipbuilding Co. has been incorporated with $250,000 capital by M. E. Rafailovich, Charles E. Emery, Francis D. Martin and Alonzo B. Parks, Bath, Me.

PORTLAND, ME. — M. Shapiro & Son, New York, have been awarded the contract for a brick and steel, 2-story, 129 x 132-foot theater building to cost $100,000 for the Nickel Amusement Co., at 565 Congress street.

BOSTON.—The Uni-Form Co. has been incorporated as an engineer with $50,000 capital by William L. Church and Nils F. Ambursen, Newton Highlands, Mass.

BOSTON.—The Suffolk Casting & Supply Co. has been incorporated with $25,000 capital by J. Jefferson Richards, L. B. Ellis, and Sylvester D. Devlin, Everett, Mass.

BOSTON.—The Davies Engineering Co. has been incorporated with $50,000 capital by Edwin C. E. Davies and others.

BOSTON.—The Mercantile Vehicles Corp. has been incorporated with $100,000 capital by Merton H. Wheelock, J. Frederick Donovan and A. F. Ellis.

BOSTON.—The Mayer-McClellan Co. has been incorporated to make leather belting with $10,000 capital by Frank H. McClellan, Ernest Mayer and L. L. G. deRochemont.

BOSTON.—The Carter, Rice & Webster Co. has let the contract for a brick and reinforced concrete, 6-story 76 x 132-foot storage warehouse to cost $100,000 on Fargo street, South Boston, Mass.

MILLBURY, MASS.—The Millbury Steel Foundry Co. has let the contract for a 1-story, 50 x 64-foot addition to its foundry and a 1-story, 30 x 120-foot pattern storage and office building adjoining its plant on Howe avenue. A heroult electric steel furnace is now being installed and is expected to be in operation about Nov. 1.

NEWTON, MASS.—The Saco-Lowell Shops has let the contract for a brick and steel, 48 x 220-foot addition to cost $20,000 to its shipping platform.

SPRINGFIELD, MASS.—Tait Bros. have let the contract for a brick, 3-story, 28 x 160-foot garage and storehouse building to cost $22,000 at 132 Cass street.

WOONSOCKET, R. I. — The Scotia Worsted Co. has let the contract for a brick, 33 x 140-foot dyehouse on River street.

WOONSOCKET, R. I. — The Sydney Worsted Co. will build a brick, 2-story, 30 x 64-foot addition to its mill in the rear of Allen street.

WOONSOCKET, R. I.—The Tips Motor Co. has been incorporated to make airplane motors with $400,000 capital by Maurice Tips, Joseph Guerin, Theophile Guerin and Edmund H. Guerin. A factory will be built.

BRIDGEPORT, CONN. — William Martin & Son have been awarded the contract for $232,942 for a brick and stone 2-story, 109 x 230-foot grammar school for the city at Steuben and Gilmore streets.

BRIDGEPORT, CONN.—The United States Airplane Co., recently incorporated in Delaware, will build a 100 x 300-foot building to make airplane motors, which will be the first of a series of buildings to cost $500,000. An engine building plant to cost $100,000 also will be constructed. Machinery has been purchased for delivery in 30 days.

HARTFORD, CONN.—The M. S. Little Mfg. Co. will build a 1-story plant, 50 x 225 feet, with a wing 20 x 70 feet to cost $25,000.

HARTFORD, CONN. — The Berlin Construction Co., East Berlin, Conn., has been awarded the contract for the steel work in the restoration of the old city hall, which is to be done at a cost of $100,000.

HARTFORD, CONN. — The Connecticut Electric Steel Co. has taken out a permit to build a 1-story, 195 x 101-foot addition at Flatbush avenue and Newfield street, to cost $25,000. The company will furnish the New Britain Machine Co., with 1,200,000 pounds of steel castings for making anti-aircraft gun mounts for the United States government.

MYSTIC, CONN.—Wood & McClure, City Island, N. Y., yacht builders, who some months ago purchased part of the plant of the Holmes Motor Works now have bought the machine shop and additional land for $30,000. As soon as the plant is equipped government work will be started.

NEW LONDON, CONN.—Bids close Sept. 24 for one 30-ton revolving crane for the government at the submarine base.

Vacation Talks with

ROLLING MILL JIM

Well, fellows, just got back from some fishing trip, and I sure had plenty of luck. I don't want to discourage any you boys that haven't had your fishing vacations yet so won't tell you this time what big catches I made, but believe me boys they were sure sound, and made me think of Hubbard rolls.

So long—

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

Along the Middle Atlantic Seaboard

BINGHAMTON, N. Y.—The board of education plans to erect an addition to the high school building, to cost about $50,000. T. I. Lacey & Son, 1110 Press building, are preparing the plans.

JAMESTOWN, N. Y. — The Jamestown Construction Co. has taken the general contract for building a 1-story plant addition, 47 x 100 feet, to cost $30,000, for the Cleveland Worsted Mills, Cleveland.

KINGSTON, N. Y.—S. Bernstein and associates, 173 Pearl street, plan to erect a theater building, to cost about $60,000. G. W. Botz, 61 John street, is preparing the plans.

NEW YORK.—Plans have been drawn for a 4-story factory and garage for the Fifth Avenue Coach Co., to be 200 x 400 feet in size. James C. McGuire, 50 Church street, is the engineer.

TONAWANDA, N. Y. — The McKinnon Chain Co. has had plans drawn for 1-story plant to be 82 x 145 feet in size. The architect and engineer is F. A. Schoemaker, Buffalo Builder's Exchange, Buffalo.

TOTTENVILLE, S. I., N. Y.—The Consumers Coal & Iron Co. has filed plans for a frame storage building to be constructed at Stapleton, at a cost of $100,000.

TOTTENVILLE, S. I., N. Y. — The Downey Shipbuilding Corp., which several months ago took over the steel fabricating plant of Milliken Bros., Inc., has filed plans for six new buildings to be erected at a cost of $163,000. The unit will comprise a 120 x 400-foot machine shop, a forge shop, pipe and copper shop, pattern shop, boiler shop and bending shop. The company, which already has completed two ships ways, will build six more.

ALLENTOWN, PA. — The plant of the Lehigh Structural Co. was damaged by fire a few days ago.

BLOOMSBURG, PA. — The Columbia County Trust Co. plans to erect a 4-story bank and office building, 24 x 120 feet. V. T. Ritter, First National Bank building, Huntington, W. Va., is preparing the plans.

DUBOIS, PA.—The city plans to construct a bridge over Sandy Lick creek on Brady street. G. A. Flink, 301 Commonwealth Trust building, Harrisburg, is the engineer in charge of the work.

EASTON, PA.—The Jacob Wilson estate will build a foundry to cost $35,000. J. W. Harrison is manager of the estate. The general contract has been awarded to Lutz & Clader, Allentown, Pa.

ERIE, PA. — The Modern Tool Co. has started work on a plant addition to cost $10,000.

ERIE, PA. — The Griffin Mfg. Co. will build a plant addition to be 1-story high 54 x 150 feet in size and cost $15,000.

ERIE, PA.—The Union Iron Works has awarded the general contract for a boiler room and power house, to be 1-story high, 58 x 89 feet in size and cost $15,000.

JOHNSTOWN, PA.—The board of education plans to erect a junior high school, to cost about $300,000. J. E. Adams, Lincoln building, and G. Wild, 734 Main street, are preparing the plans.

MILTON, PA. — The American Car & Foundry Co. is undertaking plant improvements to cost $32,000. B. B. Cannon has charge.

NEW CASTLE, PA.—The American Sheet & Tin Plate Co. has awarded Cuthbert Bros., Bessemer building, Pittsburgh, a contract to erect a 2-story addition, 56 x 70 feet, to cost $50,000.

PHILADELPHIA.—The Baldwin Locomotive Works has let a contract to the McClintic-Marshall Co. for the erection of a locomotive shop addition.

PHILADELPHIA.—The Midvale Steel Co. has let a contract to the Barclay White Co. for the erection of a 2-story, 112 x 208-foot brick and steel machine shop.

PHILADELPHIA. — The Supple-Biddle Hardware Co. is having preliminary plans drawn for a plant addition. Edwin Knight is secretary.

PHILADELPHIA. — Watson & Co. have completed plans for a 1-story, 250 x 300-foot service building, to be erected here for the White Motorcar Co., at Twentieth and Erie avenue.

PHILADELPHIA. — A permit has been granted to Frank Lucci, for the erection of a 2-story, 30 x 80-foot manufacturing building for the Fox Auto Radiator Co., at 1315 Vine street.

PHILADELPHIA. — The Girard Smelting & Refining Co. is about to take bids on the erection of a 2-story and basement, 41 x 112-foot, manufacturing addition to be erected at Tioga and Richmond streets.

PHILADELPHIA. — William Eisenberg, Pennsylvania building, has been granted a permit to erect a 1-story, 30 x 100-foot addition to the plant of the Keystone Emery Mills, at Paul and Church streets.

READING, PA.—The Philadelphia & Reading railroad has been granted a permit to erect the first unit of a new roundhouse at a cost of about $175,000. A second unit which will be erected on the completion of the first, will be 227 feet in diameter.

PHILADELPHIA.—The navy department is planning the construction of several additional buildings here, including a structural shop, power plant, etc. H. R. Harris, chief of the bureau of yards and docks, navy department, Washington, has charge.

PITTSBURGH.—The National Supply Co., Union Bank building, plans to erect a warehouse at Preble avenue, Adams and Delaware streets, to cost about $50,000.

PITTSBURGH.—The Y. M. C. A. plans to erect a building at Seventh avenue and Bigelow boulevard, to cost about $1,000,000. R. W. Harbison is president of the association.

WILLIAMSPORT, PA.—The Williamsport Wire Rope Co. will erect a pump house and reservoir. Garrott Cochran is president and general manager.

ALPINE, N. J.—The New York Tool Mfg. Co. has been chartered with $25,000 capital to manufacture and deal in tools by A. F. Andrews, Peter Turpeach and B. S. Yankus.

BAYONNE, N. J.—The Safety Insulated Wire & Cable Co., Bergen Point, will erect a 1-story addition to its plant on First avenue.

CAMDEN, N. J.—The Camden Chemical Co., which has been chartered with a capital stock of $50,000 will build a factory. C. A. Bechtel and Dr. A. Jones, are the incorporators.

GARFIELD, N. J.—De Mattia Bros., Inc., will build a 1-story foundry, to be 70 x 80 feet and cost $9000. Albert Martin Jr., 234 Randolph street, Passaic, has the general contract.

ELIZABETH, N. J. — The laboratory of the Bayway Chemical Co., which recently was damaged by fire to the extent of $10,000 will be rebuilt.

HARRISON, N. J.—The National Hoisting Engine Co. will erect a brick machine shop at Warren and Manor avenues to cost $25,000.

NEWARK, N. J.—The Bassik Co. will make foundry alterations at 574 Ferry street to cost about $8000.

NEWARK, N. J.—The General Auto Parts Corp. will build a 1-story machine shop at 328 Adams street.

NEWARK, N. J.—The machine shop of Loy & Nawrath, 21-29 Runyoun street, was damaged by fire recently, causing a loss of about $20,000.

NEWARK, N. J.—Newark Gear Cutting Machine Co., 69 Prospect street, will build a machine shop, office and pattern storage building, to be 4 stories high and 42 x 50 feet in size. Henry E. Eberhardt is president.

PERTH AMBOY, N. J.—The Raritan Copper Co. has been granted a permit to erect a new 1-story manufacturing building.

TRENTON, N. J.—The Trenton Malleable Iron Co. has let the general contract for a carpenter and pattern shop to Steven Dicklet, 440 West Hanover street.

TRENTON, N. J.—The state board of education has decided to build a new $50,000 state normal school in Gloucester county. The appropriation will become available Nov. 1 and work will be started at that time.

Trade Keeps Expanding

The Asbestos Protected Metal Co., Pittsburgh, has established a sales office in the Union Central building, Cincinnati, which will be in charge of J. C. Lathrop.

The Presto Machine Works, Brooklyn, N. Y., gages and tool room equipment, has moved into its new plant, located at 124-130 Pearl street, in that city.

A New York office has been opened by Frank D. Chase, industrial engineer, 431 Peoples Gas building, Chicago, in the Whitehall building, Battery place, New York.

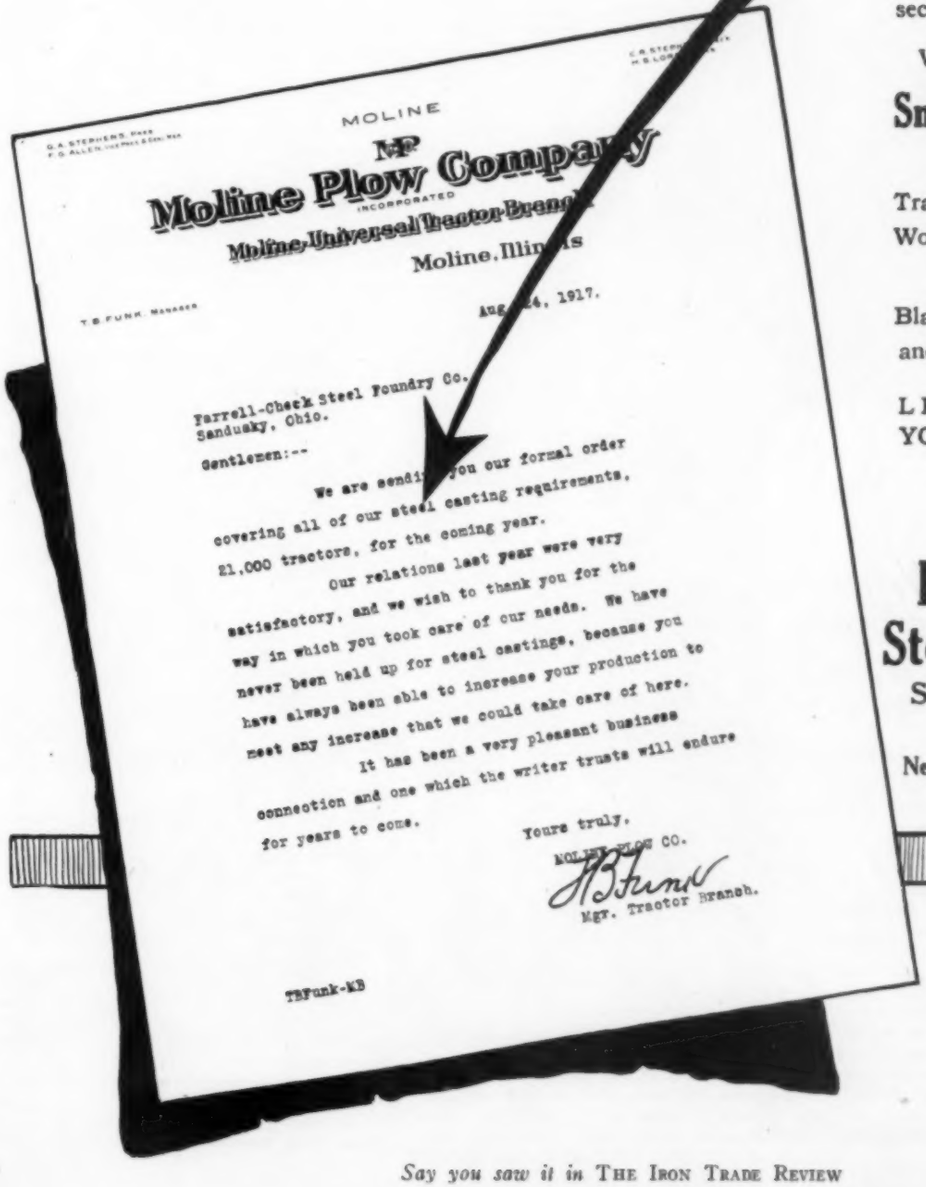
The Sangamo Electric Co., Springfield, Ill., has opened a district office in the Old Colony building, Chicago, in charge of C. H. Hurtt. A repair department will be operated in connection with the district office.

The American Brass Foundry Co., Milwaukee, has amended its charter and changed its name to that of the American Metal Parts Co.

This is Farrell-Cheek Service!

"Farrell-Cheek" *Service* is *specified time* service. When we accept your order we tell you just when you will *get* it. We tolerate no delays. In order for us to do this, we hold 30% of our capacity open for *rush* work.

We challenge you to put us to the test!


MOLINE

Moline Plow Company
INCORPORATED
Moline Universal Tractor Branch
Moline, Illinois

T.B.FUNK, Manager

Aug. 24, 1917.

Farrell-Cheek Steel Foundry Co.
Sandusky, Ohio.

Gentlemen:--

We are sending you our formal order covering all of our steel casting requirements, 21,000 tractors, for the coming year.

Our relations last year were very satisfactory, and we wish to thank you for the way in which you took care of our needs. We have never been held up for steel castings, because you have always been able to increase your production to meet any increase that we could take care of here.

It has been a very pleasant business connection and one which the writer trusts will endure for years to come.

Yours truly,
MOLINE PLOW CO.
T B Funk
Mgr. Tractor Branch.

TBFunk-kB

Furthermore "Farrell-Cheek" ***Quality*** is guaranteed to be second to none.

When you require

Small Steel Castings

for

Tractor Work, Machine Tool Work, Truck Work, etc.,

or when you wish

Blank Gears or Carbonizing and Case Hardening Boxes,

LET US FIGURE ON YOUR REQUIREMENTS

Farrell-Cheek Steel Foundry Co.
SANDUSKY, OHIO.

Branch Offices:
New York Philadelphia Chicago

New Trade Publications

STEEL.—A bulletin is being distributed by Peter A. Frasse & Co., Inc., New York, describing various grades and finishes of electrical tool and alloy construction steels. Several sets of tables designed to furnish the manufacturer with the necessary specifications for making selections are the booklet's most important feature.

BRASS SPECIALTIES. — A booklet has been published by the New York Brass Foundry Co., 104 Center street, New York, manufacturer of brass goods, describing a detector system which indicates the presence of a fire. The booklet also includes descriptions of automatic controls for closing factory doors, shutters, and other applications.

WOOD BLOCKS.—The Kettle River Co., Minneapolis, Minn., presents its creosoted block in 18 handsomely illustrated pages just issued. Halftones of floors after several years of use under heavy service are presented to indicate the durability of wood blocks. Specifications designed to aid purchasers in laying floors are also presented.

OIL ENGINES.—A 44-page catalog is being distributed by the Minneapolis Steel & Machinery Co., Minneapolis, devoted to a description of oil engines designed for heavy duty on portable machines. It is illustrated with several types of engines, including complete specifications of each. Several photographs are also reproduced showing machines in service with oil engines as the power unit. A wide range of uses are likewise presented in this section.

DRY MIXING AND GRINDING MACHINERY.—The complete line of crushing, pulverizing, grinding, mixing, sifting, bolting and packing machinery, manufactured by Chas. Ross & Son Co., Brooklyn, is described in a 96-page illustrated booklet just put out by this company. This line of equipment includes mills and special machinery for the manufacture of a great variety of products. The company also announces that it is prepared to handle any problem in the reduction of refractory materials.

PLATE MILLS. — The United Engineering & Foundry Co., Farmers Bank building, Pittsburgh, has issued a bulletin, entitled "United Plate Mills." It contains complete information regarding this company's plate mill designs. In addition to general information, the book tells some of the things the United Engineering & Foundry Co. has done. The pamphlet is profusely illustrated, showing plate mill equipment manufactured by the company. Concise descriptions of types used are presented. The bulletin describes mills for rolling sheared plate, the method of rolling and also the general practice followed in this and European countries. In addition, the bulletin takes up questions of production, heating, power requirements, arrangement of plant and rolls.

PRESSURE CONTROLLED PANELS.—The General Electric Co. recently issued an 8-page bulletin describing in detail pressure-controlled, speed-regulating panels with automatic pressure regulator. These equipments are designed for use with motor-operated feed water pumps for boilers, gas blowers, mechanical stokers, blowers, etc. The automatic pressure regulator provides a convenient means of controlling the speed of a motor operating an equipment where changes in air or liquid pressure will automatically vary the speed in order to maintain the pressure within certain limits. If the pressure varies from that to which the regulator is adjusted, the motor is said be correspondingly retarded or speeded up until the pressure is again constant.

SHEET METAL BUILDING MATERIAL.—A catalog issued by the Newport Rolling Mill Co., Newport, Ky., enters into a discussion of the merits of various kinds of iron and steel in respect to their rust-resisting qualities. The discussion of the adaptability of the company's open-hearth product for outside use, hinges upon its claim to the production of a relatively pure open-hearth iron, slowly worked of low manganese content, and carefully heat treated. This product which is an iron and copper alloy, is distinguished from copper-bearing steel in respect to its rust-resisting qualities in that the former is said to have a low manganese content; consequently few manganous segregations, and greater rust-resisting action.

GRAB BUCKETS.—The Blaw-Knox Co., Pittsburgh, has circulated a folder which illustrates and describes an excavating bucket designed to have a powerful closing effort and a minimum of line friction. The lever arm is provided with a cavity or box containing the necessary weight to overhaul the lines when the bucket is being opened. A stop chain from the head block to the lever arm is said to prevent the bucket from opening too wide. All sheaves are guarded to prevent cables from jumping off the pulleys. One pair of the corner bars is riveted to the head block, forming a rigid frame in which the head pin has its bearings, while the other pair of corner bars is press fitted and pinned to the head pin. Buckets are built in sizes varying in capacity from 1 to 4 cubic yards.

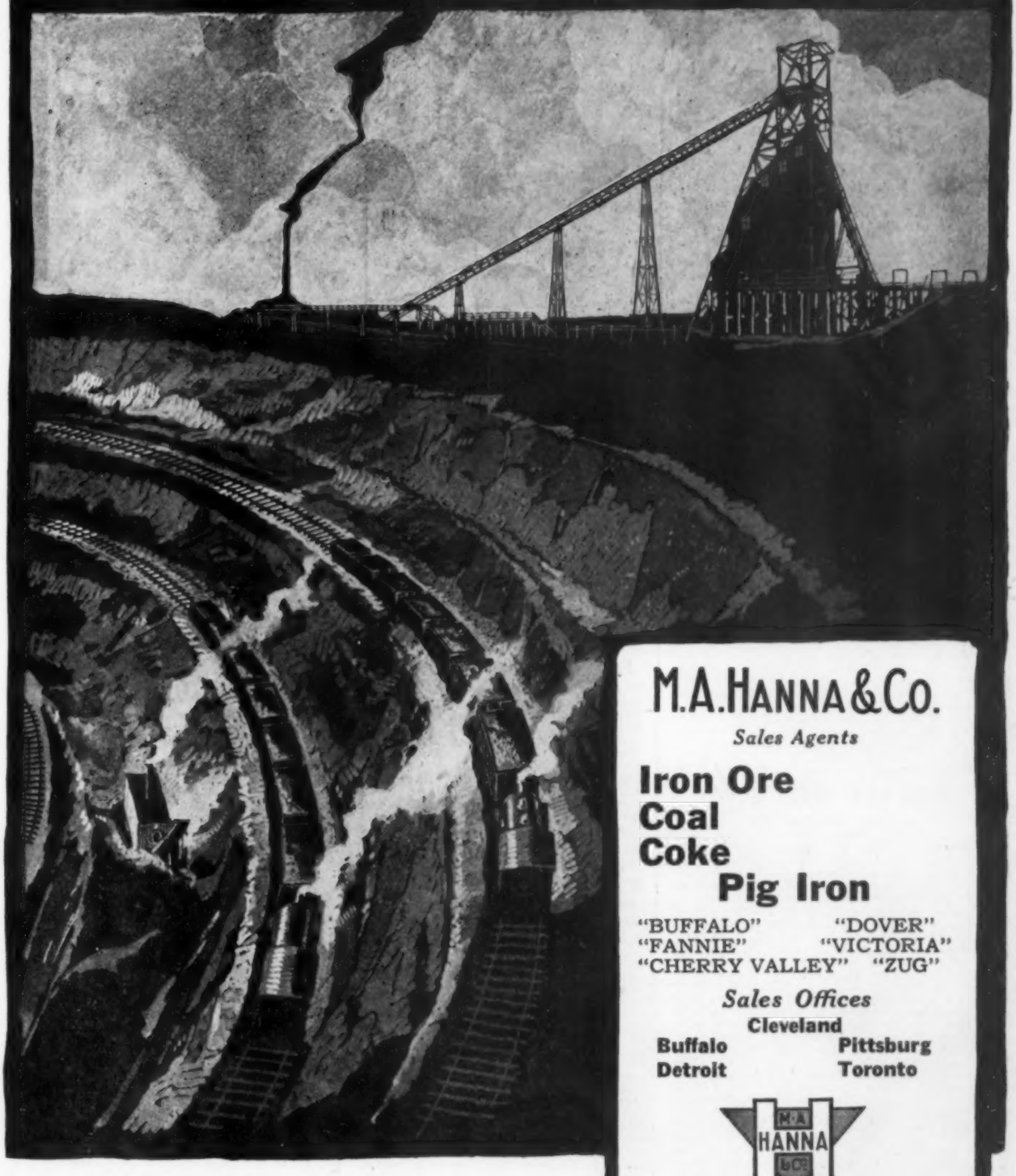
ADJUSTABLE SPEED MOTORS. — Featuring the Reliance type adjustable speed motor, the Reliance Electric & Engineering Co., Cleveland, has issued a catalog describing the method of operation of the speed-changing device used in this motor. The operation of the speed-adjusting device of the motor is accomplished by varying the strength of the magnetic field within which the armature operates. With the type of construction used, it is claimed no shifting of the driving pinion or pulley is involved. The surfaces of the armature and the inner faces of the pole pieces represent surfaces of truncated cones, one within the other with the shaft as an axis, such that a lateral movement of the armature results in a widened air gap between the two surfaces and an increased speed. The device for shifting the armature is simple and can be furnished in different forms to meet varying conditions.

HARDNESS TESTING MACHINES. — Explaining the operation of the Brinell apparatus for testing the hardness of metals, the Scientific Materials Co., Pittsburgh, has published a booklet and supplemented the description with data tables and illustrations of the apparatus. The indentation method of determining hardness consists in pressing a hardened steel sphere, which will not undergo deformation, into the surface of the metal to be tested and measuring the diameter and preferably the depth of the indentation. Computation of the degree of hardness is made possible by using the foregoing data in connection with that of the total load or force acting upon the ball. The machine used for the purpose is essentially a hydraulic press, provided with pumps, two manometers for measuring pressure and a 10 millimeter steel ball mounted upon the end of the hydraulic plunger. This type of machine will test irregularly shaped pieces in any size up to 15 inches.

AIR MOTOR HOISTS. — The Ingersoll-Rand Co., New York, recently issued a catalog describing its motor hoists and stationary motors. The hoist manufactured by this company consists of a high-duty air motor geared to a hoisting drum. A valveless motor of the three-cylinder type designed such that air is admitted and discharged through ports in the crank, and which operates with an extremely low air consumption per unit of power, drives the hoisting drum through a worm and wheel in the small size, and through a worm and wheel and a spur gear and pinion in the larger sizes. The operating valve is of the self-centering reversing type which automatically returns to the closed position when the chains are released. Speed control within wide limits also is effected by means of this valve. These motor hoists are made in five sizes, varying in capacity from 1000 to 10,000 pounds. The company also manufactures a stationary air motor for intermittent service of different kinds, furnished in two sizes, 2 and 3½ horsepower, both of which are built to conform with the general design of the hoist motors already described.

PATTERN SHOP MACHINERY.—An unusually complete catalog devoted to woodworking machinery, containing 304 pages, has been issued by the Oliver Machinery Co., Grand Rapids, Mich. Practically all of the tools essential to the modern pattern shop are illustrated and described in detail. Considerable space is devoted to the universal wood milling machine which is to the patternmaker and his department what the universal milling machine is to the tool room. This machine is furnished with either motor or belt drive. A large number of detail illustrations are included showing the various operations which it can perform and samples of work also are shown including spiral, spur and worm gear patterns. This machine also is unusually well adapted to the production of core boxes and many specimens of the most intricate nature are illustrated. A wide variety of saws for pattern shop use also are shown. A combination pattern lathe with a 90-inch swing and furnished with any length of bed is introduced to the trade by this catalog. This tool combines the functions of ordinary turning with those of turning large diameter, long cylindrical pattern box gearing, etc. Its movable carriage and tool post admits of performing an infinite variety of work. The alignment of the pillar is accomplished by loose keys which fit the various slots in the plate and it may be adjusted to operate upon the larger diameters or set directly underneath the center of the spindles to act as a bed for hand turning on small work. A patternmaker's gap lathe, also illustrated, is the result of a demand for a machine of large capacity which will occupy a minimum amount of floor space when engaging it on work of medium dimensions. The bed construction is in two sections, the upper being fitted to the lower in a dovetailed slide and is moved either by hand-wheel rack and pinion or by power, to and from the headstock to close and open the gap, by means of gearing that engages the rack on its lower gearing that engages the rack on its side.

HANNA



M.A. HANNA & CO.

Sales Agents

Iron Ore
Coal
Coke
Pig Iron

"BUFFALO" "DOVER"
"FANNIE" "VICTORIA"
"CHERRY VALLEY" "ZUG"

Sales Offices

Cleveland
Buffalo **Pittsburg**
Detroit **Toronto**

M·A HANNA & Co

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.

Old range Bessemer, 55 iron	5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05
Port Henry Ores, non-Bessemer, Per Unit,	

Delivered Eastern Pennsylvania.

Old Bed, crude 55 iron	10.50c to 11.00c
Old Bed., concent., 65 iron	11.00c to 11.50c
Harmony, concent., 63 iron	11.50c to 11.75c
Lump (at mines)	$5.75

WAREHOUSE PRICES

Steel bars, Chicago	4.50c
Steel bars, Cleveland	4.50c to 5.00c
Steel bars, Detroit	4.50c
Steel bars, Philadelphia	5.00c to 5.50c
Steel bars, New York	4.75c to 5.00c
Steel bars, St. Louis	4.55c
Steel bars, Cincinnati	**5.00c**
Steel bars, St. Paul	4.60c
Steel bars, Buffalo	4.60c to 5.10c
Iron bars, Chicago	4.50c
Iron bars, Cleveland	4.45c to 4.95c
Iron bars, Detroit	4.50c
Iron bars, St Louis	4.45c
Iron bars, Cincinnati	**5.00c**
Iron bars, Philadelphia	5.00c to 5.20c
Iron bars, New York	5.00c
Shapes, Chicago	5.00c
Shapes, Detroit	5.00c
Shapes, St. Louis	5.05c
Shapes, St. Paul	5.10c
Shapes, New York	5.00c to 5.25c
Shapes, Cleveland	5.00c to 5.25c
Shapes, Philadelphia	5.00c to 5.50c
Shapes, Buffalo	5.10c to 5.35c
Shapes, Cincinnati	**5.25c**
Plates, Chicago	7.00c to 10.00c
Plates, Detroit	**9.00c to 10.00c**
Plates, St. Louis	7.05c to 7.55c
Plates, St. Paul	**7.10c**
Plates, New York	8.00c to 9.00c
Plates, Cleveland	9.00c to 10.00c
Plates, Philadelphia	10.00c
Plates, Cincinnati	10.00c
No. 10 blue anl. sheets, Chi.	9.50c to 10.00c
No. 10 blue anl. sheets, Cleve.	8.75c
No. 10 blue anl., Buffalo	11.00c to 11.75c
No. 10 blue anl., sheets, St. L.	10.05c
No. 10 blue anl. sheets, Cinci.	10.00c
No. 10 blue anl. sheets, St. Paul	9.60c
No. 10 blue anl. sh., Detroit	9.50c
No. 28 black sheets, Chgo.	9.50c to 10.00c
No. 28 black sheets, Cleve.	8.75c
No. 28 black sheets, Cincin.	8.65c
No. 28 black, Detroit	**9.50c**
No. 28 black sheets, St. L.	10.35c
No. 28 black sheets, St. Paul	9.60c
No. 28 galv. sheets, Chgo.	11.00c to 11.50c
No. 28 galv. sheets, Cleve.	10.50c
No. 28 galv. sheets, Cincin.	10.65c
No. 28 galvanized, Detroit	11.00c
No. 28 galv. sheets, St. L.	11.55c to 11.75c
Hoops, Cleveland	6.00c
Hoops, Detroit	**7.00c**

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$25.00 to 27.00
Bundled sheets, Cleveland	24.00 to 25.00
Bundled sheets, Buffalo	20.00 to 21.00
City wrought, short, N. Y.	27.00 to 28.00
Frogs, switches, guards, St. L.	32.00 to 31.00
Heavy melting steel, Pitts.	36.00 to 38.00
Heavy melting steel, Buffalo	31.50 to 32.00
Heavy melting steel, Chgo.	31.00 to 32.00
Heavy melt'g steel, Cleveland	31.50 to 32.00
Heavy melting steel, Cinci.	29.50 to 30.00
Heavy melting steel, east. Pa.	31.00 to 32.00
Heavy melting steel, N. Y.	27.00 to 28.00
Heavy melting steel, St. L.	33.00 to 34.00
Heavy melting steel, Birming.	20.50 to 21.50
Hydraulic pressed sh'ts, Cleve.	27.00 to 28.00
Hydraulic press. sheets, Pitts.	31.00 to 32.00
Hydraulic pressed sh'ts, Chgo.	24.00 to 25.00
Low phos. steel, Buffalo	41.00 to 42.00
Low phos. steel, Pittsburgh	48.00 to 49.00
Low phos. steel, eastern Pa.	40.00 to 45.00
Shoveling steel, Chicago	29.00 to 30.00
Shoveling steel, St. Louis	31.00 to 32.00
Steel rails, short, Chicago	38.50 to 39.50
Steel rails, short, Cleveland	34.00 to 35.00
Steel rails, short, St. Louis	42.00 to 43.00
Steel rails, old, Birmingham	24.00 to 25.00
Stove plate, Cincinnati	17.50 to 18.00
Stove plate, St. Louis	17.00 to 17.50
Stove plate, N. J. points	20.00
Stove plate, Birmingham	17.50 to 18.50
Stove plate, Buffalo	21.00 to 22.00
Stove plate, eastern Pa.	21.00 to 22.00
Stove plate, Pittsburgh	24.00 to 24.50

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$20.00 to 21.00
Boiler plate, cut, No. 1, St. L.	19.50 to 20.00
Bundled sheets, Cincinnati	17.50 to 18.00
Knuckles, coup., Chicago	35.00 to 36.00
Knuckles, coup., St. Louis	41.00 to 42.00
Springs, Chicago	42.00 to 43.00
Stove plate, Chicago	16.75 to 17.75
Stove plate, Cleveland	19.50 to 20.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54

Buffalo to:

Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10

Virginia furnaces to:

Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88

Birmingham, Ala., to:

Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	4.25
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54

Duluth, Minn., to:

Minneapolis-St. Paul	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	11.6 cents
Baltimore	18.0 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	76.1 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama	61.0 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Buffalo	28.00 to 29.00
Busheling, No. 2, Buffalo	18.00 to 19.00
Busheling, No. 1, Pittsburgh	25.00 to 27.00
Cast borings, New York	18.50 to 19.00
Cast borings, eastern Pa.	22.50 to 23.50
Cast borings, Buffalo	20.00 to 21.00
Cast borings, Pittsburgh	22.00 to 22.50
City wrought, long, N. Y.	31.00 to 32.00
Forge flashings, small, Cleve.	26.00 to 27.00
Forge flashings, large, Cleve.	24.00 to 25.00
Forge, No. 1, eastern Pa.	23.00 to 24.00
Grate bars, Buffalo	20.00 to 21.00
Grate bars, N. J. points	19.00
Iron axles, Pittsburgh	50.00 to 52.00
Iron axles, Cincinnati	44.00 to 44.50
Iron axles, eastern Pa.	50.00 to 55.00
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	42.50 to 43.00
Iron rails, Buffalo	43.00 to 44.00
Iron rails, Cincinnati	32.50 to 33.00
Iron rails, St. Louis	43.00 to 44.00
Iron rails, Cleveland	42.50 to 43.50
Machine turnings, Buffalo	$18.00 to 19.00
Machine shop turnings, N. Y.	19.00 to 19.50
Mach. shop turnings, Pitts.	23.00 to 23.50
Mch. shop turnings, east. Pa.	19.00
Machine turnings, Birming.	11.00 to 12.00
R. R. mch. cast, No. 1, Buff.	30.00 to 31.00
R. R. wrought, 1, Buffalo	43.00 to 44.00
R. R. wrgt., No. 1, east. Pa.	43.00 to 47.00
R. R. wrought, No. 1, Pitts.	43.00 to 44.00
R. R. wrought, 1, B'ham	25.50 to 26.50
Wrought pipe, Buffalo	28.00 to 29.00
Wrought pipe, eastern Pa.	31.50 to 32.50
Wrought pipe, New York	27.00 to 28.00

(Net Tons)

Angle bars, iron, Chicago	$40.00 to 42.00
Angle bars, steel, St. Louis	31.00 to 32.00
Arch bars & transoms, St. L.	43.00 to 44.00
Arch bars & transoms, Chgo.	41.00 to 42.00
Busheling, No. 1, Chicago	24.50 to 25.50
Busheling, No. 1, Cincinnati	21.50 to 22.00
Busheling, No. 1, Cleveland	25.00 to 26.00
Busheling, No. 1, St. Louis	24.50 to 25.00
Busheling, No. 2, Chicago	16.75 to 18.25
Cast borings, Cincinnati	14.50 to 15.00
Cast borings, Cleveland	17.50 to 18.00
Cast borings, St. Louis	17.00 to 18.00
Cast borings, Chicago	16.00 to 17.00
Cut forge, Chicago	31.00 to 32.00
Grate bars, Cleveland	20.00 to 21.00
Iron axles, St. Louis	45.00 to 46.00
Iron axles, Chicago	45.00 to 46.00
Iron axles, Cleveland	45.00 to 46.00
Machine shop turnings, Chgo.	16.25 to 16.75
Mach. shop turnings, Cleve.	17.50 to 18.00
Machine shop turn'gs, Cinci.	14.50 to 15.00
Mach. shop turnings, St. L.	20.00 to 20.50
Pipes and flues, Cleveland	23.50 to 24.00
Pipes and flues, Chicago	22.00 to 23.00
Pipes and flues, St. Louis	20.50 to 21.00
Railroad wrought, 1, Cleve.	39.00 to 40.00
Railroad wrgt., No. 1, Chgo.	36.00 to 36.50
Railroad wrought, 1, Cinci.	33.00 to 34.00
Railroad wrought, 1, St. L.	36.00 to 37.00
Railroad wrgt., No. 2, Chgo.	31.00 to 32.00
Railroad wrought, 2, St. L.	34.00 to 35.00

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$25.00 to 26.00
Axle turnings, Buffalo	26.00 to 27.00
Shafting, New York	37.00 to 38.00
Shafting, eastern Pa.	45.00 to 47.00
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	47.00 to 48.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	49.00 to 50.00
Steel car axles, Pittsburgh	50.00 to 52.00
Steel car axles, eastern Pa.	50.00 to 55.00

(Net Tons)

Shafting, St. Louis	42.00 to 43.00
Steel car axles, St. Louis	41.00 to 42.00
Steel car axles, Chicago	43.00 to 44.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	$36.00 to 37.00
Car wheels, (steel), Pitts.	45.00 to 46.00
Car wheels, Chicago	31.00 to 33.00
Car wheels, eastern Pa.	36.00 to 38.00
Car wheels, Buffalo	35.00 to 36.00
Car wheels, New York	32.00 to 33.00
Car wheels, St. Louis	33.00 to 34.00
Car wheels, Birmingham	23.00 to 24.00
Car wheels, Cleveland	29.00 to 30.00
Tram car wheels, Birming.	20.00 to 21.00
Cast, No. 1, Birmingham	23.50 to 24.50
Cast, 1, machy., N. J. points	34.00 to 35.00
Cast, 1, heavy, N. J. points	32.00 to 33.00
Cast, No. 1, eastern Pa.	30.00 to 32.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	22.00 to 22.50
Malleable railroad, Cleveland	31.00 to 32.00
Malleable railroad, Buffalo	32.00 to 33.00
Malleable railroad, Pittsburgh	31.00 to 33.00
Malleable railroad, east. Pa.	32.00 to 34.00

(Net Tons)

Cast No. 1, Cleveland	25.00 to 26.00
Cast, No. 1, Chicago	24.00 to 25.00
Cast, No. 1, Cincinnati	23.00 to 23.50
Cast, No. 1, St. Louis	25.00 to 26.00
Malleable railroad, Chicago	31.50 to 32.50
Malleable railroad, St. Louis	31.00 to 32.00
Malleable agricultural, Chgo.	25.00 to 26.00

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$45.00
Reroll. rails, 5 ft. & ov., Chgo.	40.00 to 41.00
Reroll. rails, 5 ft. & ov., E. Pa.	41.00 to 43.00
Reroll. rails, 5 ft. & ov., St. L.	44.00 to 45.00
Reroll. rails, 5 ft. or ov., Cleve.	41.00 to 42.00
Rerolling rails, long, Birming.	37.50 to 38.50

(Net Tons)

Boiler punchings, Chicago	35.00 to 36.00
Locomotive tires, Chicago	42.00 to 43.00
Locomotive tires, St. Louis	45.00 to 46.00